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THE SEIBERLING VALEDICTORY

THE retirement of Frank A. Seiberling and his brother, Charles W., from The Goodyear Tire & Rubber Co. brings a pause in the career of two who added to rubber history some of its most dramatic incidents. Beginning in 1908, the Akron works, with a product of $500,000, grew in 1920 to more than $200,000,000. During that period more than $20,000,000 was paid in dividends. There was also added a factory in Canada, and another in California. A third was also planned for Brazil. To assure raw material, there were established rubber plantations in Sumatra, cotton plantations in Arizona, and fabric mills in Connecticut and California. From these bases radiated agencies, selling units and service stations covering the wide territory in which their markets were found. All told, Goodyear employed some 66,000 people.

The creation of this vast enterprise called for the broadest vision, undaunted courage and extraordinary organizing faculty. All of these attributes the senior Seiberling had to a very unusual degree. His brother Charles, an engineer and practical rubber man, although never in the lime-light, was a factor of the greatest value.

It is a pity that the great depression came when it did. One year more of good automobile business and high-priced cotton would have carried the huge business out of the breakers and into safety.

Not that there appears in the valedictory of the senior Seiberling any lessening of his cheerful optimism. He plans a short vacation. He has earned one, and may he return refreshed and again find his place among the leaders of the rubber trade.

TIRES NOT A LUXURY

To the rubber industry the recent pronouncement of President Harding that "the motor car has become an indispensable instrument in our political, social, and industrial life," is particularly significant. It presages a policy of Federal control of highways that cannot help but add to the efficiency and popularity of motor vehicles and incidentally benefit, in a considerable way, the great tire industry. The President further urges Congress to so amend the Federal Road Act that the national agency of administration would be given greater scope and authority, and to prescribe conditions for Federal aid to states that will insure a high standard of road construction and proper maintenance.

The nation's Chief Executive well realizes that waste and improvidence have long been associated with much of the state and county road work in all parts of the country. He recognizes the commanding place of the automobile industry in our national life—attested by sales of $3,500,000,000 in 1920—and the motor vehicle as one of the five major units of transportation. In regarding interstate highways as of vital commercial and military importance, and in insisting upon standards of road construction and upkeep that will vie with the best in Europe, he is doing the automobile and allied industries, and in fact the whole nation, a service of incalculable value.

THE ENGINEERING FOUNDATION AND RUBBER

IN aiding engineers not only in varied achievements, but in the furtherance of general scientific research and the advancement of human welfare in the broadest sense, scarcely any agency compares in accomplishment or potential service with The Engineering Foundation of United Engineering Society, New York, N. Y., which has just completed its sixth year of usefulness. In its latest report it points out that there is need of support for further researches, many of them being of especial interest to rubber men, as, for instance, such as concern electrical insulation, colloidal lubricants and the fundamental principles of lubrication, developing maximum energy from all kinds of fuel, highway construction (in-

volving tire-making), principles of heat transfer (involving vulcanization), and industrial education and training. An institution with aims so high, scope so universal, methods so efficient, and sponsored by the nation's foremost and most practical men of science well merits all the substantial encouragement the rubber industry, and all others, can afford it in establishing funds for the uses named as well as for its many other worthy purposes.

THE ABSURD "CAPITAL STRIKE" CLAIM

FAILING to make an impression of the unthinking with their old harangues, agitators conjured up a new contention lately in the hope of stirring up dissension between employe and employer. Labor has been told that the real cause of diminished employment and a reduced pay scale has been a combination of the great banking interests of the nation to deflate wages and to humble the worker; in other words, that "capital was on strike against society." The absurdity of such a claim is obvious to any unbiased student of economics. The banks function best and profit most when prosperity is general. Their interests are most intimately involved with the interests of the vast mass of wage-earners, whose savings they conserve and reinvest in thousands of enterprises. The latter can flourish only in good times, and hence it is manifestly foolish to claim that they and the banks that finance them with the earners' savings would "strike" to lessen their business opportunities.

The plain truth is that the United States has had to bear its share of the world-wide reaction after the war, and it is to the great credit of the banks that they prevented American business from "skidding" more than it did in the rapid deflation.

COTTON ACREAGE FOR 1921

SOUTHERN cotton raisers obtained from the banks loans totaling hundreds of millions of dollars in anticipation not only of great crops, but also of big prices for those crops. The cotton came in quantity, but not the expected demand for the commodity. Accordingly, prices fell rapidly, cotton reserves piled up, and growers and bankers have been hit hard.

The American cotton production for 1920-1921 is estimated at 13,000,000 bales, with a carry-over of 5,000,000, making a supply of 18,000,000; whereas the demand is not expected to exceed 11,000,000, thus leaving a surplus of 7,000,000, which, added to next season's normal production of 13,000,000, would provide a supply of 20,000,000 against a probable demand of but 12,000,000. A price rise in the face of such a surplus pressing for sale is unlikely.

That cotton prices will be governed more by the world's stock of all kinds of cotton rather than the stock in our country, just as the prosperity of the United States will depend largely on the settlement of the present conditions which are existing throughout the world, is undoubtedly the broader view.

A BRAIN WORKERS' UNION

THE BRAIN WORKERS' UNION, or Confederation des Travailleurs Intellectuels, which was founded in France some time ago, is an experiment which similar workers throughout the world are watching with interest. A membership of over 200,000 has already been reached, and artists, journalists, clerks of all grades and trades, school teachers and scientists, individually and as corporations, are said to be clamoring for inclusion.

In its aims, this organization promises moderation and professes antagonism to no other body in civic life. Its members do state that their interests are being ground between the upper and nether millstones of capitalism and manual labor, and that it is time they took joint action on their own behalf. The saving clause in their constitution is to the effect that they will impose their will on none of their members, giving support only where it is asked, and leaving absolute liberty to all to govern their own affairs. Such an organization, if true to its avowed principles, would neither curtail the production of brain work nor allow itself to be controlled by a few demagogs.

That is, however, hardly probable as mankind is at present constituted, for the reason that men are not equal in a productive sense. As a majority will rule, and as the majority are only ordinary in accomplishment, the capable will be dragged down to the level of the mass. In other words the artist who gets $10,000 for a creation will be forced to turn out $10 daubs and only a limited number of them. That is, of course, if this Union follows such other unions as we wot of.

Human nature admits of but one union where equal effort would result in maximum production and that is loafing. The world is hungry for a loafers' union, a Universal Federation of Loafers, no work, no hours and double pay for overtime.

PROOFERS, I. E., MAKERS OF RUBBERIZED CLOTH, SO often troubled with deterioration of the coating on the fabric through the action of certain textile dyes, may find a ray of hope in the report that a southern cultivator has, after several years of plant cross-breeding, produced samples of cotton that shade from light brown to dark brown and from light green to dark green. With a strain of blue-tinted or linted cotton he is getting from India, this Burbank of Dixieland is confident that he will also produce soon an absolutely black cotton and as fast as alpaca compared with lambs' wool.

The Manufacture of Chewing Gum

Processes and Machinery

IN a preceding article[1] the origin and extent of the American chewing gum industry was given, together with a brief description of chicle, chicle substitutes, other chewing gum ingredients, formulas, and a typical factory plan.

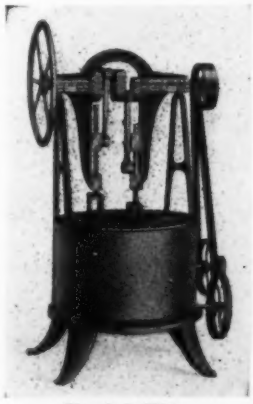
The machinery equipment of a modern chewing gum factory includes such rubber working machinery as washers, mixers and kneaders and some machines utilized in candy making, but most of the mechanical equipment is specially designed for making chewing gum.

American Chicle Co.

FIG. 1. CRUDE CHICLE IN WAREHOUSE

The successive steps in the manufacture of chewing gum are essentially the following:

The blocks of crude chicle are roughly broken into lumps by any convenient means and thrown into bins for storage and drying preliminary to reduction to a fine state of division either in a chicle chopper or a special grinder. The chopper reduces the gum to about the size of beans, and the grinder to that of rice. The chicle is next spread upon a sorting table where bark, chips, etc., are removed by hand.



Clough & Witt.

FIG. 2. CHICLE CHOPPER

From the sorting table the material is taken in trays to a mechanically ventilated drying room where it is dried at a temperature not exceeding 90 degrees F. for a few days or until needed for use.

In the larger plants the ground chicle is dried in rooms supplied with "conditioned" air at 72 degrees F. and 55 per cent relative humidity. These atmospheric conditions are also maintained in the cooling and packaging rooms.

GUM CLEANING PROCESSES

One of the most important features in chewing gum manufacture is making the crude chicle gum and substitutes clean and sanitary by removing the bits of bark, sand, clay, fiber from bags, dirt, filth and other foreign matter which are always present.

The sticky nature of chicle causes it to gather many impurities during its collection by the natives. Foremost are the bark and dirt from the gum trees themselves, which gets into the latex as it is being collected. As the Indians pack the gum great distances through the jungles, an ever increasing amount of dirt adheres to it. When finally it is piled on the shore awaiting shipment overseas, it collects more wind-blown sand and clay. Every stage of its handling is in fact part of a continuous process of gathering dirt.

Hand and other methods commonly employed to remove this dirt are unsatisfactory and costly. Hand picking at best removes only the largest particles of impurities to which considerable gum adheres. Not only is the adhering gum lost, but often what appears to be only bark, when split open shows gum deposited between the bark layers. As a rule, over half the weight of the pickings consists of good chicle gum which is wasted, representing a great annual loss of money. While larger impurities are removable by hand picking or sifting, it is entirely impossible to remove the smaller specks of bark, sand, clay, grit, bat lint and other dirt. These remain and contaminate the finished chewing gum. The presence of these impurities spoils the smoothness of the gum and has a direct effect on the sale of the finished product. Nothing depreciates the chewing quality of a gum more than the presence of grit. Many gum chewers insist on buying only those brands which are free from such contamination. In fact, the production and sale of dirty chewing gum is a menace to public health and in direct violation of the Federal Food and Drugs Act.

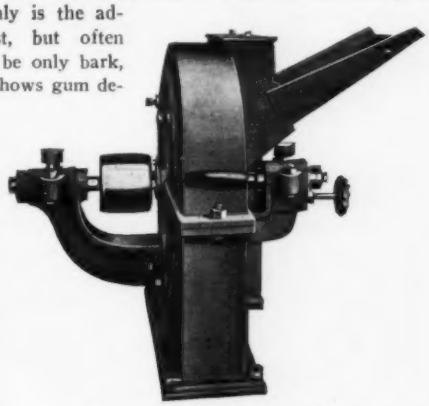
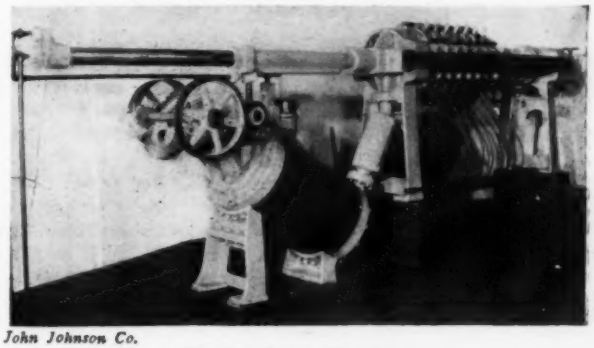


FIG. 3. MEADE MILL

FILTERING CHICLE

The remarkable machine pictured below is standard gum cleaning equipment in the plants of the largest chewing gum manufacturers for blending, sterilizing and filtering free from all impurities the chicle and substitute gums employed. It is estimated that over half the world's production of chicle is now filtered through these cleaning machines.



John Johnson Co.

FIG. 4. CHICLE FILTER

[1]The India Rubber World. May 1, 1921, pages 558-560.

The chicle and other gums to be mixed are placed in the mixing cylinder shown at the left in Fig. 4 and are melted under pressure and mixed by a geared screw. Owing to the pressure created a low-melting temperature is obtained which does not destroy the delicate texture of the gum, which if heated in the

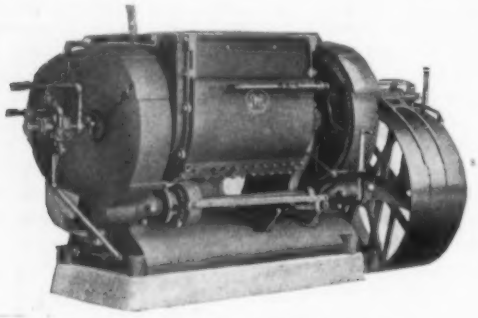
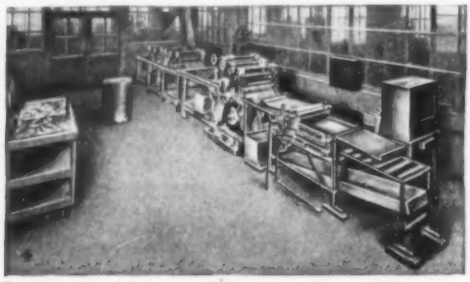


FIG. 5. W. & P. MIXING MACHINE

atmosphere would rapidly toughen. The correct amount of moisture is controlled and a perfectly homogeneous blending of the mixture obtained. With the gums to be cleaned, a certain amount of clean, soft wood saw-dust is added to the charge in the mixing cylinder for the purpose of forming a mat or filtering surface on the wire screening in the filter press into which the thoroughly melted gum mixture at the proper consistency is forced by compressed air at 200 pounds pressure. The filter press is heated by steam circulation supplied through flexible metallic hose connections to each section.

The filtered chicle is delivered through spouts along the side of the press, and the foreign matter and saw-dust separated from



American Chicle Co.

FIG. 6. GANG KNEADER AND ROLLER

the gum is subjected to hydraulic pressure of 100 tons before removal from the press. The hot clean chicle is received from the filter press in weighed amounts in suitable metal containers and transferred directly to the dough mixers for incorporation of the various compounding ingredients.

The separation of foreign matter by the filter press is absolutely complete, all bark, sand, clay, fiber, etc., being removed in the form of dry cakes and the chicle delivered perfectly smooth and clean. All vessels and piping in which chicle is blended, cleaned or filtered are necessarily steam jacketed to maintain fluidity of the gum.

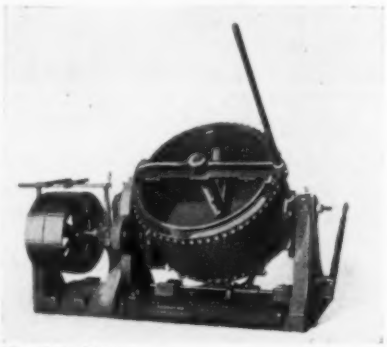
COMPOUNDING

Following the process of blending, cleaning and sterilization the filtered fluid gum is drawn into receptacles in weighed amounts and transferred to a tilting steam-jacketed mixing kettle or dough mixer, for mixing with selected compounding ingredients. These are glucose, paste, powdered sugar and flavoring extracts added to the melted gum in fixed order; first, glucose and caramel paste both of which aid in the absorption of the dry sugar; next, one-half the sugar. As soon as the latter is absorbed in the mixing the remainder of the sugar is added, followed by the flavoring material. The temperature of the mass is about 250 degrees F.

MIXING KETTLES

Mixing kettles vary in capacity from a few gallons to 200 gallons per batch. Two forms much used in the chewing gum industry are illustrated. Fig. 5 shows a rectangular trough of special form, inside which operate two steel blades of special design, carried by two horizontal shafts which pass through the end walls of the trough. Stuffing boxes prevent the material leaking from the trough along the shafts, the bearings of which are separate and distinct from the stuffing boxes. The latter do not act as bearings. The trough is jacketed for cooling or heating and the blades are made hollow for the same purpose. The tilting of the trough is done by a lever. A straight and cross-belt drive is provided by means of which the machine may be run in either direction or stopped at will.

The second form of gum mixer shown in Fig. 7 has a cylindrical steam-jacketed receptacle arranged for tilting. The lever at the right of the machine locks the kettle in any position between the vertical and the horizontal, so that the mixer can be run at any angle desired. The time required for mixing a batch of chewing gum is usually less than an hour.



Clough & Witt

FIG. 7. TILTING MIXER

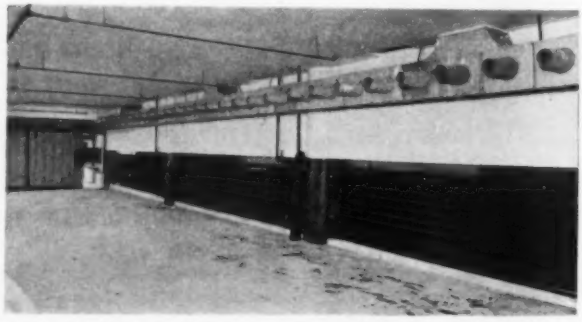
COOLING

The mixed batch is tilted out of the mixer in small portions into pans or tanks, dusted with powdered starch and sugar to prevent adhesion of the dough, and set aside to cool preliminary to kneading into batches or loaves of convenient size.

ROUGH ROLLING

The stock passes next to the rough-rolling machine which may be either a single set of rolls or a gang roller such as that shown in Fig. 6.

The machine consists of a hopper which delivers the rough stock to a pair of rollers between which a thick sheet passes



American Chicle Co.

FIG. 8. CONDITIONING ROOM

downward to the first pair of roughing rolls and by conveyor through the succeeding rollers which finally deliver the stock sheeted approximately to the gage of the final product.

HARDENING

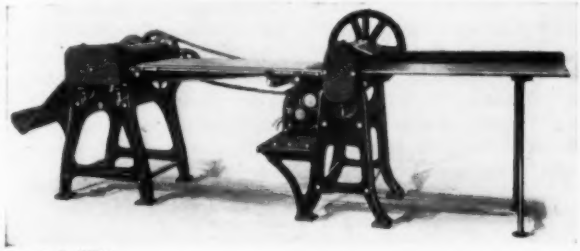
The rough-rolled stock is trayed and set aside to cool naturally for 24 hours or is left for the same length of time in a room supplied with conditioned air. This period of rest and cooling sets the stock so that in the second or finishing rolling the exact gage will be retained.

STICK GUM SIZES

The usual sizes for stick gum are 3 by ¾ by 1/16-inch although the product of the largest manufacturers measures 2⅞ by ¾ by .070-inch.

FINISHED ROLLING AND SCORING

The cooled and hardened rough sheeted gum is rolled to finished gage and scored in a machine provided with two sets of



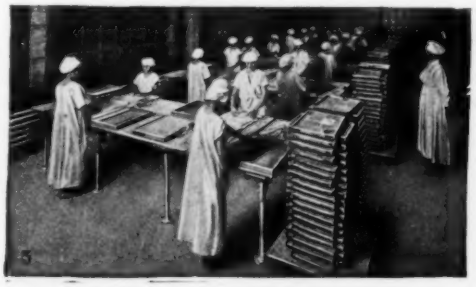
Clough & Witt

FIG 9. SCORING MACHINE

rolls. The first pair have circular cutters spaced to score the rolled sheet lengthwise into stick width, while the second pair have longitudinal knives for cross-scoring the sheet for stick lengths. Both sides of the sheet are scored at the same time, the cuts extending one-third the way through from each side, leaving the center of the sheet to be broken in separating the individual sticks. In the case of gum in small squares such as "chiclets" or "nuggets," the scoring is spaced equally both ways.

BREAKING THE SHEETED GUM

The scored gum sheets are hardened for a time in air-conditioned cooling rooms before separation into pieces. Stick gum is broken by hand, a very skillful operation done by women.



American Chicle Co.

FIG. 10. GUM BREAKING DEPARTMENT

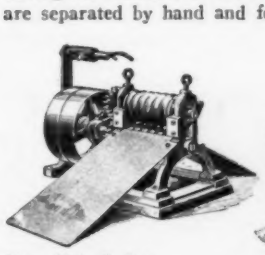
They remove the side trim from the sheets, break the sticks apart and pack them edgewise in trays at a single handling, ready for the packaging machines.

"CHICLETS"

Sheets of gum scored in small squares are broken apart by tumbling in an octagonal revolving barrel open at the front end where the scored sheets are thrown in. These promptly break apart and are removed by the attendant in a large hand scoop which he holds in the tumbler to receive them.

BALL GUM

Chewing gum in the form of balls is made by the use of two separate machines. The first known as a sizing machine consists of a pair of grooved rolls through which a kneaded batch of gum emerges in the form of round bars or cylindrical sticks having the diameter of the finished ball. These cylinders of gum are separated by hand and fed to a ball-making machine. This,



Thos. Mills & Bro.

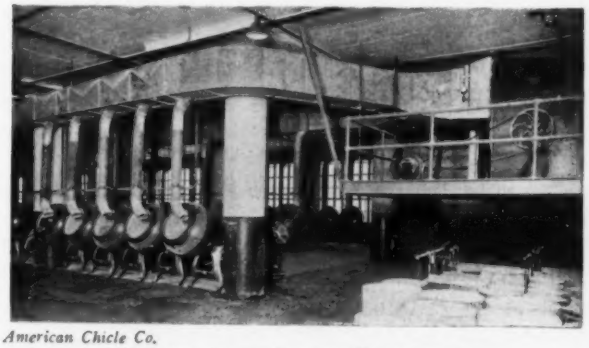
FIG. 11. BALL SIZING MACHINE

FIG 12. BALL ROLLING MACHINE

like the sizing machine, consists of a pair of grooved rolls, both of which revolve in the same direction, but one has double the speed of the other. The effect on the gum cylinders which are fed sidewise into the ball machine, is to cut the stock into short cylinders which are promptly rolled into approximate spheres by the differential speed of the rolls, and drop out on the side opposite to the feed.

CANDY COATING

The operation of candy coating small squares and balls of gum is an operation in confectionery making and is accomplished in a tumbler known as a coating pan. The pan is made of heavy



American Chicle Co.

FIG. 13 CANDY COATING DEPARTMENT

hammered copper in spherical form, is lined with tin and mounted on an inclined axis on which it revolves with sufficient speed to cause the contents to ascend the sides of the pan to about the horizontal diameter, thus producing a tumbling of the goods as they fall back. This action distributes the sugar syrup evenly over the charge and the friction gives the dried coating a polished surface. To facilitate the operation of coating, conditioned air is constantly supplied to the interior of the pan. By this means the moisture in the sugar syrup is rapidly removed.

Coating pans are usually set up in rows and one operator can attend to many. The sugar syrup for coating is supplied to the pan by hand, one ladleful at a time. In the largest gum factories the operation of coating is hastened by the use of conditioned air piped through large ducts with an outlet entering each pan of the group. The low relative humidity, 55 per cent, and the rapid ventilation materially shortens the time of coating and polishing accomplishing the operation in about three hours.

AUTOMATIC PACKAGING

Except in small factories where wrapping and boxing is done by hand, packaging of gum is effected by the use of automatic machines. The model shown in Fig. 14 is specially designed for packaging stick gum. It makes up the standard five-cent foil package of stick gum. The machine wraps each stick in either foil or wax paper, applies a band to the individual stick and seals it. It then assembles five wrapped, banded sticks, reversing the fifth one so that the front of the outside stick shows whichever

side of the package is opened, and finally bands the five sticks together and seals the package with paste. The individual sticks, inside bands and outside bands are fed from magazines and the

American Chicle Co.

FIG. 14. PACKAGING DEPARTMENT

foil or waxed paper for the first wrapping is fed from a roll and cut to proper length. The output of the machine is 100 boxes of 20 packages per hour.

ANTIMONY SULPHURET, ITS MANUFACTURE AND USE[1]

By D. A. Shirk[2]

IN the rubber industry, "antimony sulphuret" is the trade name applied to precipitated sulphides of antimony containing various percentages of free sulphur and adulterants. The sulphides are generally present as pentasulphide or oxysulphide. With certain exceptions, manufacturers use the words "golden" and "crimson" to indicate pentasulphide and oxysulphide, respectively, and the word "golden-crimson" when both are present.

GOLDEN ANTIMONY

Golden antimony is obtained from the reaction between either calcium sulphantimonate, $Ca_3(SbS_4)_2$ or sodium sulphantimonate, Na_3SbS_4 and either sulphuric, sulphurous or hydrochloric acid. It is evident that when sulphuric acid is employed to precipitate from the calcium solution that calcium sulphate is also precipitated. This calcium sulphate being quite insoluble remains in the final product and dries to $CaSO_4.2H_2O$. The free acid is generally washed out by decantation or filtering, although it is sometimes neutralized with an excess of calcium carbonate or calcium hydroxide. Irregularities in the preparation of the salt solutions, concentrations, temperatures, washing, drying and grinding will result in products which, although they may be superficially similar will give many different results under vulcanization.

CRIMSON ANTIMONY

Crimson antimony is commercially produced by the reaction between sodium or calcium thiosulphate and a solution of antimony trichloride in hydrochloric acid, or a suspension of antimony oxychloride in an acid solution. The calcium salt is not as stable as the sodium salt and where it is used there is often present in the finished product certain quantities of calcium sulphite. This product is always tested for acid and should be tested for chlorides as well. It is well known that good qualities of both crimson and golden antimony will sometimes after long standing give a faintly acid reaction due to the formation of a very small amount of sulphur dioxide. This should not be confused with the presence of traces of hydrochloric acid or antimony chloride, the responsibility for which must be borne by the producer.

COLOR OF ANTIMONY

The color of antimony, or rather its ability to retain its color at elevated temperatures, is of important consideration. Contrary to the popular belief a reliable grade of golden antimony, or pentasulphide, does not, under vulcanization, decompose to Sb_2S_3 and sulphur. The physical stability of color is an indication of the chemical stability of the pentasulphide. When golden antimony is subjected to elevated temperatures it does not yield any free sulphur until its color changes. As the color changes to brown certain amounts of free sulphur appear and finally when the color becomes black the amount of free sulphur yielded is about equivalent to the amount calculated upon the theoretical decomposition of the pentasulphide to the trisulphide. It becomes evident, therefore, that to use a golden that just turned brown under cure would result in a situation where the total amount of free sulphur acting would be very indefinite.

ADVANTAGES IN RUBBER GOODS

Antimony sulphuret of proper grade and properly used has three distinct advantages. First, it is an accelerator. Antimony sulphuret in a compound will enable the maximum cure to be obtained at a given temperature and time with the use of less free sulphur. This presents the great advantage of reducing the amount of uncombined free sulphur in the vulcanized product. This in itself gives one explanation of the second advantage, namely, good aging. The superior aging quality of a good red tube is quite generally recognized.

A third advantage is the increased sales value of a bright clean orange or red stock over a blooming grey stock. Some manufacturers use antimony because the free sulphur it carries is generally all precipitated and hence in a much finer state of division than the ordinary flour sulphur. Others stress the fact that with antimony they obtain a stock of much softer "feel" than with any other compounding ingredient.

SOURCES OF SUPPLY

Prior to September, 1914, there was in the United States only one manufacturer of antimony sulphuret in quantity. England and France furnished the major part of the antimony used in this country, although just at that time Germany was beginning to make serious inroads into the business of their other European competitors. When the war shut off the European supply American manufacturers met the situation with products which today represent the very best that can be found in any market.

POINTS ON QUALITY

There are not many differences between a pure golden or crimson antimony aside from color and price. The crimson is considerably more expensive but imparts to the stock a deep red color that the pentasulphide will not give. On the other hand, many prefer the golden shade when it is clean and bright. The chemist should be particular that the antimony retains the brilliancy of its color under his particular conditions of vulcanization, for the reasons given above. The best texture cannot be obtained where there is any large quantity of calcium sulphate. This is chiefly due to the large particle size of this material. Every rubber chemist wishing to be sure of his ground on antimony should make a careful study of particle size and agglomeration. Everything else being the same, the percentage of antimony sulphide present should determine the price. Most of the uncertainty and distress in the use of antimony in rubber work will permanently disappear when the trade accepts as a standard an acid-free, pure, stable pentasulphide, of a specific state of division, carrying a specified percentage of free sulphur.

[1] The Rubber Age, New York, May 10, 1921.
[2] The Rare Metal Products Co., Belleville, New Jersey.

VULCANIZING EFFECT

Antimony sulphuret of itself is not a vulcanizing agent but any effect produced on the physical properties of rubber cured with it is due entirely to the free sulphur which the sulphuret contains. While true, this observation has often been misconstrued and the idea conveyed that aside from the coloring properties of the antimony sulphides, there are no properties which advantageously effect the vulcanization of rubber.

Investigation has shown that although antimony sulphides alone will not vulcanize rubber, they will, when incorporated in a rubber-sulphur mixing, produce a maximum tensile strength in a shorter time and with a lower proportion of free sulphur to rubber than it is possible to obtain when an inert filler is used instead of the antimony sulphides or when a simple rubber and sulphur mixture is employed. It has been demonstrated that in this accelerating action the pentasulphide is more efficient than the trisulphide and that the acceleration of cure is not due to the colloidal nature of the free sulphur contained in the pentasulphide.

The use of commercial flour sulphur with antimony pentasulphide gives results at least equal to those obtained by the use of colloidal sulphur coprecipitated with antimony pentasulphide.

AMERICAN RAILWAY ASSOCIATION, MECHANICAL DIVISION, MASTER CAR BUILDERS' AND MASTER MECHANICS' SPECIFICATIONS.

STANDARD STEAM-HEAT HOSE

Adopted, 1916; Revised, 1917

I. MANUFACTURE

1. SCOPE. These specifications cover steam-heat hose for passenger equipment cars.

2. Steam-heat hose shall be composed of a tube of rubber, wrapped with at least five plies of cotton fabric and the whole covered with rubber.

II. PHYSICAL PROPERTIES AND TESTS

3. The railway company's inspector will select for test one piece at random from each lot of 201 pieces. When this hose is received at the test laboratory, a section 2½ inches long will be cut from one end in order to determine the friction, tensile strength and elongation. The remaining portion will then be subjected to steam heat in the digester. After this section has been heated another section 2½ inches long will be cut from it and used to ascertain the friction, tensile strength and elongation, in order to show the change in these characteristics due to the action of heat.

4. FRICTION TEST BEFORE STEAMING. A section 1 inch long will be cut from the hose and supported in such a manner that it will turn freely on its axis. A 20-pound weight will be suspended from the separated end of the fabric. The latter must unwind uniformly, if at all, and not faster than 6 inches in ten minutes.

5. TENSILE TEST BEFORE STEAMING. A strip cut from the tube with a die or other suitable means to the dimensions shown in Fig. 1 will be marked at points 2 inches apart, and the width and thickness will be accurately measured. It will then be slowly stretched in a suitable tensile-testing machine until it breaks. The ultimate tensile strength must not be less than 600 pounds per square inch and the elongation of the 2-inch section at the time of fracture must be not less than 6 inches.

6. FRICTION TEST AFTER STEAMING. A section 1 inch long will be supported in such a manner that it will turn freely on its axis. A 15-pound weight will be suspended from the separated end of the fabric. The latter must unwind uniformly, if at all, and not faster than 6 inches in ten minutes.

7. TENSILE TEST AFTER STEAMING. A strip cut from the tube with a die or other suitable means to the dimensions shown in Fig. 1 will be marked at points 2 inches apart, and the width and thickness will be accurately measured. It will then be slowly stretched in a suitable tensile-testing machine until it breaks. The ultimate tensile strength must not be less than 450 pounds per square inch, and the elongation of the 2-inch section at the time of fracture must not be more than 8 inches or less than 4 inches.

8. DIGESTER TEST. The digester shall consist of a cylinder containing dry saturated steam at a pressure of 45 pounds per square inch. The hose shall be put into this digester and will remain there for 48 hours continuously. An examination of this section, after being submitted to the heat of the steam, should not disclose any blistering of the inner tube or any loosening of the tube from the fabric. Examination and test after heating, prescribed in the specifications, will be made as soon as possible after the specimen has cooled for 24 hours. The tests will be made at a temperature of not less than 60 degrees F.

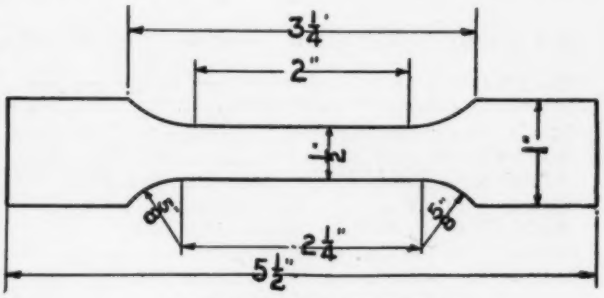


FIG. 1. TENSILE SPECIMEN

III. SIZE AND DIMENSIONS

	Maximum Inches	Minimum Inches
Length	24¼	23¾
Inner diameter	....	....
Outer diameter	....	....
Thickness of tube	....	1/16
Thickness of cover	....	1/32

IV. WORKMANSHIP

9. TUBE. The tube should be composed of at least two calenders of rubber. It must be free from holes, bits of wood, bark, sand and other foreign matter, and from other imperfections. It must be so firmly joined to the fabric that it can not be pulled off without tearing it.

10. FABRIC. The fabric must be of duck, with the warp containing not less than 27 strands, 3 threads per strand, and the filler 18 strands and 4 threads per strand. It must be frictioned on both sides and have, in addition, a distinct layer of rubber on one side, readily visible between the plies when the finished hose is cut open.

11. COVER. The material of the cover should be a rubber compound which has good weather-resisting qualities, as firmly attached to the fabric as is the tube, and to be equally free from defects. The end of the hose should be cut off true to length, but shall not be capped.

V. MARKING

12. SERIAL NUMBER. Each lot of 200 hose or less must bear the manufacturer's serial number, beginning with one on the first of each year and continuing consecutively until the end of the year. Serial numbers of hose which are rejected must not be used again. With each lot of 200 hose or less, one extra piece of hose must be furnished free of cost.

13. LABEL. Each piece of hose must have securely vulcanized to it a label of white or red rubber, as shown herewith.

FIG. 2. LABEL

VI. INSPECTION

14. INSPECTION. If the sample passes all the tests, all pieces represented by it will be accepted if free from injurious mechanical defects.

Rejected hose will be returned at the expense of the manufacturer.

15. REJECTION. If the sample fails to pass the above tests, the lot represented by it will be rejected and the same serial number must not be applied to any other steam hose during the same calendar year.

16. REHEARSING. Samples tested in accordance with these specifications, which represent rejected hose, shall be held for two weeks from date of test report.

Artificial Lighting in the Rubber Industry—V[1]

By E. Leavenworth Elliott

The Two Bases of Figuring the Efficiency of a Lighting System

CONSIDERATIONS THAT DETERMINE THE SELECTION AND ARRANGEMENT OF LIGHT UNITS

IN the laying out of an industrial lighting installation there are two considerations which will govern the selection of the units, and their arrangement in the several spaces to be lighted: (1) The effect upon the efficiency of the operatives working under the light, and (2) the mechanical efficiency of the apparatus itself.

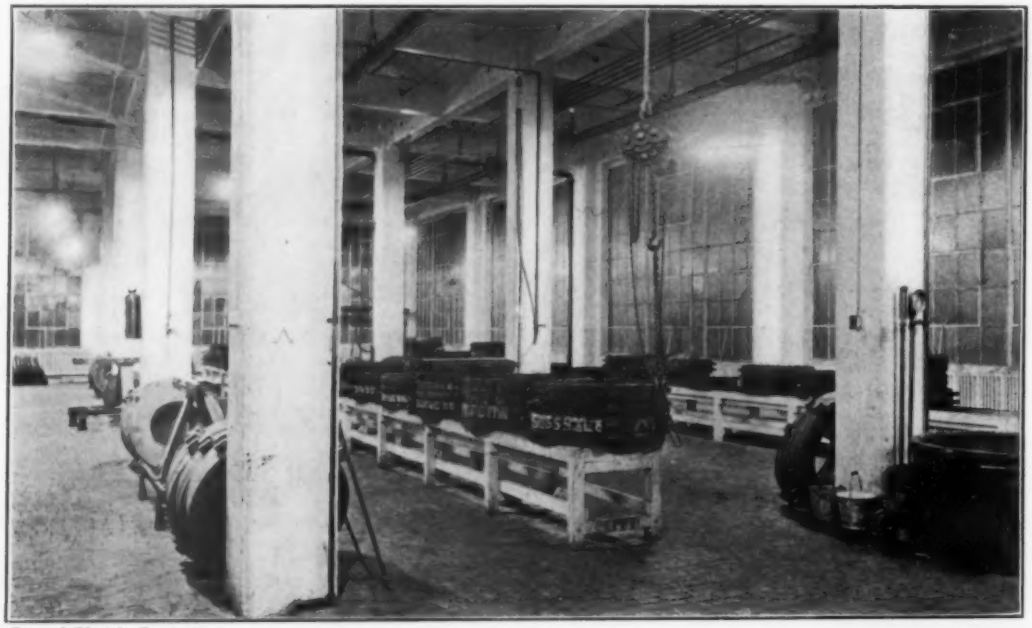
Obviously, the first of these considerations is by far the more important. The theologian seeking arguments in support of the dogma of "total depravity" would find a rich source in the field of shop lighting. It is no uncommon thing to find a factory manager who will select a lighting unit on a basis of a cent a day difference in maintenance cost where the use of a twenty-thousand-dollar machine and a twenty-dollar daily pay-roll are more or less completely dependent upon the light supplied. Just stop a moment and figure out the total cost of operating a heavy calender—interest, depreciation, power, superintendence, general overhead, wages of the operatives, and see what proportion of this total is expended for the light used for its operation. Then figure the value of the materials which it handles, and make a similar computation. Can you think of a more exaggerated case of "saving at the spigot and wasting at the bung-hole" than to trim on the cost of light at the possible risk of trimming proportionately on the efficiency of this operation?

The effect of the illumination on the efficiency of production will depend upon the following conditions: (1) The *quality* of the light, which is determined by the different kinds of radiations of which it is composed. (2) The *intensity* of illumination on the objects concerned in the work. (3) The *direction* of the light, which determines the effects of relief and contour. (4) Incidental conditions which interfere with vision—the various forms of glare, and unnaturally sharp or dark shadows.

The selection of the light-source will be determined by a consideration of the first and last of these conditions. The location of the chosen units, or the "lay-out," will be determined by the last three conditions. The facts to be considered in making the selection of the light-source have been discussed in the preceding articles, and also some of the problems pertaining to the lay-out. There remains a little further consideration of the matter of location of units, and a discussion of mechanical efficiency.

THE TWO METHODS OF LIGHTING

In general, there are two ways to figure a lay-out: you can either light the room, or light the job. Most "illuminating engineering" formulas refer to room lighting. This is all right in some cases and all wrong in others. In many cases lighting the job will also light the room sufficiently. In other cases, lighting the room is the most practical way to light the job.



General Electric Company

A GOOD EXAMPLE OF ROOM LIGHTING BY COOPER-HEWITT LAMPS IN THE VULCANIZING DEPARTMENT
IN THIS CASE DIRECTIONAL LIGHT IS NOT NECESSARY, AND A GOOD GENERAL ILLUMINATION ANSWERS ALL PURPOSES

Lighting the job involves two general cases: machine lighting, and bench lighting. The two important considerations in machine lighting are shadows, and direction of rays. To light the particular parts of the machine and materials that you want to see—without shadows of yourself, or your tools, or other parts of the material falling just where you must see the most clearly—is not always an easy matter, and in practice is much less common than its importance demands.

Take tire-building machines, for example; the core and the tire must be seen from both sides, and the light must come from a position in front of the operator, and not too high up. This is a good example of what we mean by "lighting the job." If the

[1]Continued from THE INDIA RUBBER WORLD, April 1, 1921, pages 483-486.

greatest mechanical efficiency of lighting is to be obtained, that is, the minimum amount of light used, the machines must be arranged with reference to the light-units. Thus in the case of the machines just referred to, they must be set so that one unit will light one side each of two machines. Similarly, tire-building stands may be set in rows so that the operatives face each other with the light-units hung over the aisle, thus giving the desired front light free from shadows.

To set a machine with reference to a lamp may seem at first a case of the tail wagging the dog, but a moment's consideration will reveal the simple fact that it is just as easy to set a machine so as to permit the most efficient lighting as in any other way. Such a system will more frequently contribute to economy of installation and operation than otherwise.

IMPORTANCE OF DIRECTED LIGHT

The problem of shadows is a matter of the direction of the light and the size of the luminous source—the larger the source the smaller and less distinct the shadows. The mercury-vapor lamp with its luminous tube four feet long presents a corresponding advantage over the incandescent units, which are relatively small. Add to this the greater visual effect of green light at the lower intensities—which constitutes shadows—and the shadow problem is pretty nearly eliminated by the use of these units. In the case of small machines set close together a good intensity—not less than 10 foot-candles—of general illumination by C-H lamps will usually afford the best solution of the problem.

There are many cases in which a strong directional light is essential to the most efficient vision. Thus, fabrics show their texture much more distinctly when illuminated by a strong light from one side. Air bubbles in tires show up plainer by side light than by "end-on" light. In all cases where small differences in the surface must be observed side light should be used. This applies particularly to inspection.

Bench and table lighting is the same general problem, irrespective of the work done, and is the simplest of all problems to solve. Where possible the benches should be double, that is, the operatives working on each side, so that units placed above give an unobstructed light to all. The practice of placing benches along the side of a room in front of the windows is open to serious criticism, and is a relic of the days when daylight afforded the only illumination by which fine work could be done. In modern mill construction with the large area of window space, benches at right angles to the windows are better for both natural and artificial light.

Room lighting is now about as simple a proposition as bench lighting. As we have pointed out before, the law of the survival of the fittest, operating in the development of electric lamps, has reduced the units available for industrial use to two types; the mercury-vapor lamp and the gas-filled tungsten lamp, bowl frosted or enameled, and fitted with a white enameled steel reflector. These give the same distribution of light, and all the necessary calculations can be made by the use of a little simple arithmetic with the assistance of the distribution curves furnished by the manufacturers, as previously explained. With proper room, bench, or machine lighting, the use of drop-lights is practically eliminated—which is good riddance to an old-time nuisance.

WIRING FOR A FLEXIBLE SYSTEM OF LIGHTING

But suppose you "light the job," that is, place the units with reference to the machines, and later rearrange the machines, or use the space for other purposes; will not this require a rearrangement of the light-units, necessitating more or less rewiring? It undoubtedly will. That is part of the cost of improvements due to the general progress in the art, or to faulty engineering, or lack of engineering at the start.

In the case of a building or room specially designed for the operation of certain kinds of machines, the chance that it will be used for other purposes, or that the character of the machines will be radically changed in the near future is sufficiently small to justify a single system of wiring to supply the light-units decided upon. But in a room that is equally well suited to any of the machinery or processes used in the production of the general line of rubber goods, and which may, therefore, be utilized for different purposes in the growth of the plant, it is manifestly better engineering to provide a sufficient number of outlets with their corresponding switches and fuse blocks, to enable light-units to be installed at any point desired with a minimum of special wiring. This, of course, refers to new buildings.

A very practical arrangement of this kind, which is being used by one of the most progressive rubber manufacturers, is to run two rows of outlets down each row of bays, the outlets being "staggered" so as to give three in each bay. The outlet consists of the female half of a plug inserted permanently in the cement ceiling. The light-units are then placed with reference to the illumination desired, connected to the nearest outlet, and controlled by pendent switches.

THE MECHANICAL EFFICIENCY OF THE LIGHTING SYSTEM

There now remains to be considered only the question of the mechanical efficiency of the lighting system as a whole. As in all the other calculations with reference to illumination, rigid exactness is impossible, and we must be satisfied with more or less close approximations.

As in the case of any other mechanical equipment, the cost may be considered under two general heads, namely, fixed charges, and maintenance. In the present case fixed charges will include interest on the original investment and depreciation (amortization). Maintenance will include cost of electric current and repairs or renewals. For the purpose of comparison let us assume that the lighting installation will be operated 3,000 hours a year. In the two available systems, the mercury-vapor and incandescent, there are no two units which are exactly comparable in respect to light produced or current consumed, so the better method will be to take the nearest alternatives and then reduce the results to a common basis—say of 1,000 lumens of light for a year of 3,000 hours. We will, therefore, take the standard mercury-vapor lamp having a 50-inch tube and white reflector, and using 430 watts of current, and the incandescent unit consisting of bowl frosted gas-filled tungsten lamp equipped with the standard R. L. M. reflectors, using 400 watts. The mechanical efficiencies of the units, as given by the manufacturers, is as follows:

Unit	Current	Total lumens	Lumens per watt
Mercury-vapor	430	6,129	14.2
Incandescent, 400-watt	400	4,350	10.9

The total operative cost by these several units for a year, and 3,000 hours' use, will be:

	Mercury-Vapor	Incandescent 400-Watt
First cost of permanent parts	$22.85	$3.21
Interest at 6 per cent on first cost	1.37	.19
Depreciation at 12½ per cent	2.85	.40
Renewals	4.50	9.45
Current at 1 cent per kilowatt-hour	12.90	12.00
Total operative cost	$21.62	$22.04
Operative cost per 1,000 lumens	$3.53	$5.07

In the above table the cost of lamps is figured on an average quantity discount. Maximum and minimum discounts would make a difference of about 25 cents and 60 cents per 1,000 lumens, respectively.

The figures are also based upon initial performance. The depreciation in candle-power by photometer measurement may be somewhat greater with the mercury-vapor than with the tungsten lamps; but the results of the psychophysical experiments, which accord with general experience, show that any difference of this kind is much more than offset by the higher visual value of mercury-vapor light.

The cost of renewals is based upon a guaranteed life of the mercury-vapor tube, three years, and the estimated life of the tungsten lamp, 1,000 hours.

From the cost per lumen it is very easy to figure the cost for

any given amount of illumination. One lumen gives an intensity of one foot-candle on one square foot of surface. One thousand lumens will therefore light 100 square feet with an intensity of 10 foot-candles, or 200 square feet with 5 foot-candles, or 66 square feet with 15 foot-candles, and so on. It will be easy to remember, and sufficiently accurate, to consider that mercury-vapor light costs $3.50, and tungsten light $5 per 1,000 lumens, with current at 1 cent. Increasing the cost of current increases the cost of tungsten light somewhat more than it does of mercury-vapor light. To be exact, with current at 2 cents, the latter light will cost $5.63 and the former light, $7.82 per 1,000 lumens per year.

No figures are given for cleaning and repairs for the reason that the conditions determining these costs are too variable to admit of any estimation of value. So far as replacements are concerned the mercury-vapor lamp will require attention once in three years, according to the guaranteed average life of tubes; the tungsten unit will require attention three times a year for the same purpose. For cleaning, each will, of course, require equal attention. The mercury-vapor lamp contains an operating mechanism, which will sometimes need attention and repairs. On the whole, this may be considered a fair offset for the labor expended in the more frequent renewals of the tungsten units; so that this item reduces to a fifty-fifty proposition as between the two types of lamps.

A CONVENIENT METHOD OF STATING THE COST OF ILLUMINATION

The true basis for measuring the cost of light, considered simply as a form of power, is by taking the product of lumens into hours, just as electricity is measured by watt-hours, or for practical use, by 1,000-watt or kilowatt-hours. As the costs per 1,000 lumens just given were for 3,000 hours' use, the cost per 1,000-lumen-hour—which we may very properly call the kilolumen-hour—will be .003 of the amounts given, or 1 cent per k.l.h. for the mercury-vapor, and 1½ cents per k.l.h. for the tungsten light.

It is interesting to use these rates to figure the cost of illumination for the individual workman. Suppose he occupies 100 square feet of space, and is supplied with an intensity of 10 foot-candles—which is sufficient for first-class work under most conditions; he will require one kilolumen, and in an eight-hour day will use 8 k.l.h. costing 8 cents for the mercury-vapor, and 12 cents for the tungsten light. The practical reader may amuse himself by figuring what percentage this is of the workman's wages, and of the value of the materials which he handles. Lastly, he may consider the difference between furnishing the workman 10 foot-candles and 5 foot-candles—from 4 cents to 6 cents a day—evaluated in terms of wages, and in spoiled, or defective work. He will then have an example of that principle in logic known as *"reductio ad absurdum,"* which may be freely translated as a "damned absurdity."

In conclusion: It may appear to the reader who has never given particular attention to the technical points involved in modern lighting that we have drawn the subject out to a tedious length. To this I may reply that only those points have been considered which have a direct and important bearing on the subject, and these as briefly as consistent with a fair comprehension of the subject. I may also remark, that besides numerous matters not touched upon in these articles, whole volumes have been written upon most of the topics we have considered, not to mention numerous papers and discussions before scientific societies. The one simple conclusion is, that lighting in modern industrial institutions is not a mere matter of hanging up a lamp here and there, but is a problem of first-class importance in its relation to production costs and general welfare.

SUMMARY

The efficiency of a lighting installation is to be estimated from two standpoints: the effect upon the output of labor, and the cost of producing the light.

The effect of light on the output of labor depends upon (1) the quality of the light, (2) intensity of illumination, (3) direction of light on work, and (4) freedom from conditions which reduce visual efficiency.

The choice of the kind of light-unit will depend upon the first and last of the above conditions.

The lay-out, or location of the units, will be determined by the last three conditions.

There are two ways of making a lay-out: so as to light the room, or light the job.

Lighting the job consists of machine lighting and bench lighting. It differs from room lighting in that the *direction* of the light is of prime importance.

Room and bench lighting are easily arranged in accordance with the simple engineering data given.

The mechanical efficiency of a lighting system is the relation of cost to the quantity of light used. It is most conveniently computed in 1,000-lumen (kilolumen) hours. The items to be considered are: interest and depreciation of installation, electric current, repairs and renewals.

The cost of illumination is less than 2 per cent of the wages of those working under it.

RUBBER TIRES AND THE PROPOSED VEHICLE LAW

A favorable impression is being made throughout the country by the draft of the proposed uniform vehicle law indorsed by the Motor Vehicle Conference Committee of The Rubber Association of America, Inc., the American Automobile Association, the Motor & Accessory Manufacturers' Association, Inc., the National Automobile Dealers' Association, and the Trailer Manufacturers' Association of America. The committee, in preparing the tentative measure, considered not only the road builder, road user, and the vehicle maker, but also the carrying capacity of the road, and the general welfare of the public, and the fees to be imposed are to be in lieu of all taxes. The committee will do its best to have the proposed law adopted as fully as possible in the forty-eight states.

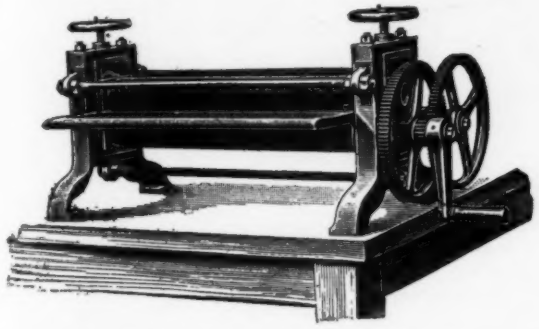
Taking into account the fact that rubber-tired vehicles are less harmful to roads than those with metal tires, the fees for registration, etc., are much less for the former than the latter. Thus, a motor vehicle with pneumatic tires would pay 25 cents per 100 pounds gross weight of vehicle and load, one with solid rubber tires, 35 cents, and one with iron, steel, or other hard tires, 50 cents. The same schedule would apply to tractors, while the rate for horse-power would be 25 cents additional, applicable to all classes of vehicles aforementioned. For trailers and semi-trailers the weight scale ranges as follows: Pneumatic tires, 15 cents per 100 pounds; solid rubber tires, 25 cents; iron, steel, or other hard tires, 35 cents. Motorcycles and motorcycle sidecars would be taxed uniformly $5 each.

In computing the weight of trucks, it is provided that "no vehicle having a load of over 800 pounds per inch width of tire upon any wheel concentrated upon the surface of the highway (said width in the case of rubber tires to be measured between the flanges of the rim) shall be operated in any state."

Vehicles equipped with pneumatic tires of gross weight of not over 7,000 pounds and carrying seven passengers would be allowed to go 30 miles an hour on open country highways, 20 miles on suburban streets, and 15 miles on city streets. Other pneumatic-tired vehicles carrying a weight of from 6,000 to 28,000 pounds would be restricted to 25, 20 and 15 miles in the same order. Solid-tired vehicles of 4,000 pounds gross weight would be allowed to make 25, 20 and 15 miles, but those of 8,000 pounds, 20, 18, and 12 miles. Vehicles of 12,000 pounds would be limited to 18, 15, and 12 miles, and of 16,000 pounds, 16, 15, and 12 miles. All over that weight, and up to 28,000 pounds, would be held down to 15, 15, and 12 miles an hour.

Embossing Machines Used in Rubber Manufacture

THE surface ornamentation of soft rubber goods is obtained usually by engraved designs upon plates or molds into which the rubber is forced during vulcanization. Goods that are cured in beds of talc or in dry heat, however, have their surfaces ornamented before vulcanization. This is accomplished as a rule



MULLER CUT SHEET EMBOSSING MACHINE

when the material is still in the sheet form and before it has gone either to the cutting or making-up departments.

An example of this is cut sheet from which European tobacco pouches and articles of that sort are made. The very beautiful wavy lines on the surface of cut sheet are simply knife marks left in the cutting process which is analogous to the production of wood veneers. It has often been the ambition of the manufacturers to imitate this by using engraved rolls in connection with the calender, but the result is not good.

Calendered sheet is, however, embossed by the Müller machine so that it looks like cut sheet. This machine is very simple and

FLEURS-DE-LIS WATER MARK STRAIGHT LINE

HOT-WATER BOTTLE EMBOSSING

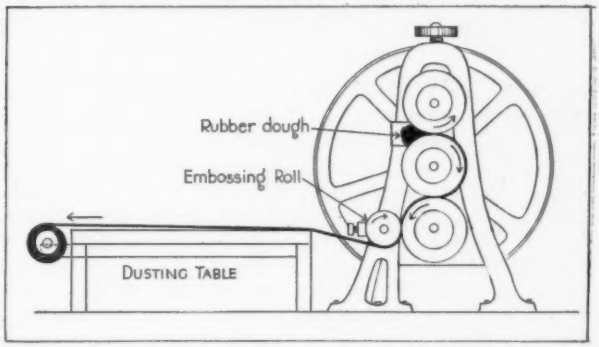
is operated either by hand or by power. It consists of two fluted rolls the upper of which may be raised or lowered to accommodate different thicknesses of stock which is passed once through the rolls, and the wavy lines are permanently impressed upon its surface.

For water bottles, fountain syringes, dress shields and many other ribbed stocks the old-fashioned way was to run the stock on heavily ribbed cloth and trust to the impression thus given. It was far from perfect and was later supplanted by the use of vulcanized squares that were deeply ribbed. Sheets of stock were placed upon these forming sheets and cold pressed for twenty-four hours. They were then stripped and sent to the cutting room. As this process was slow and expensive, it in turn was supplanted by a grooved roll mounted on a frame and bolted fast to the calender bed plate. The roll is adjustable, with screws at both ends, and if the embossed stock is to be dusted when calendered, a dusting table is used.

EMBOSSING CARRIAGE CLOTH

Rubber carriage cloth for covering the tops of automobiles, as it comes from the calender, is of a dull dead black or brown color, similar to the finish usually found on rubber blankets. While this sort of finish is suitable for some work, most users require cloth with a small raised design. The following four styles of impressions are common:

1. The pinhead pebble where the cloth looks as though it were covered with pinheads about 1/32-inch apart.
2. Long grain, which is popular with the automobile top manufacturers, looks as though scratched all over with the point of a pin, no regular design being carried out.
3. English grain. Here raised lines are about 1/16-inch wide by 3/4-inch long, and all one way, but no two lines cross.



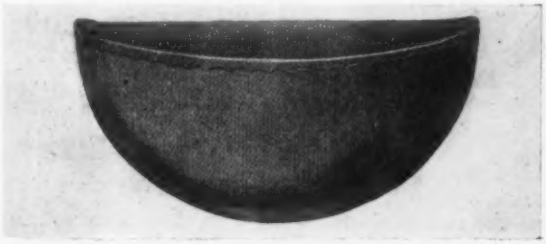
SIDE ROLL EMBOSSING CALENDER WITH DUSTING TABLE

4. Flat grain, in which the lines are about 1/16-inch wide, very short and crooked, and are scattered over the cloth close together and running in all directions.

In order to give the cloth this finish it is run through an embossing calender.

THE STANDARD EMBOSSING CALENDER

This machine usually has three rolls (sometimes two), set horizontally. The middle or drive roll is of steel, 8 inches in diameter by 60 inches long, and is engraved with the reverse pattern desired on the surface of cloth. The top and bottom rolls are of steel, covered with paper by hydraulic pressure, and are twice the diameter of the middle engraved roll. The driving



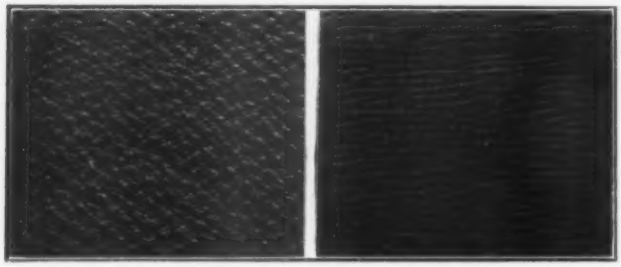
CUT SHEET TOBACCO POUCH—NOTE WAVY LINES

arrangement is the same as in any ordinary calender, with gears on the rolls to run them at even surface speed, as the engraving on the 8-inch steel roll forms an impression on the paper rolls

and must follow this impression at each revolution. The operation of the machine is as follows:

A roll of cloth that has been previously coated is placed in the friction let-off bearings on the feed side of the calender, and the end of the cloth passed between the engraved roll and the lower paper-covered roll. This end is attached to a wind-up arrangement and rolled as fast as calendered.

Speaking of the paper rolls, when the machine is new the rolls are ground or turned down smoothly. The pattern of the steel roll is run into them by dampening the paper and running the machine until the paper roll or rolls are well tracked. In this

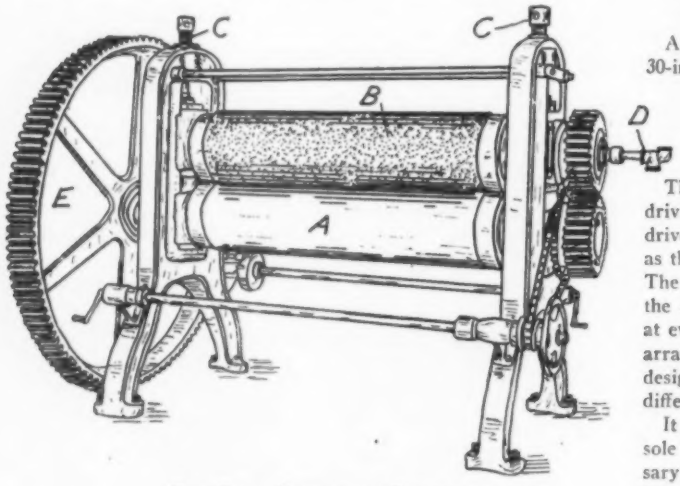


LEATHER PEBBLE LEATHER GRAIN
CARRIAGE CLOTH EMBOSSING

way, with a small steel roll, a good impression may be obtained on the tightest goods.

TWO-ROLL EMBOSSING CALENDER

A two-roll embossing calender for producing carriage cloth with a pebble or leather-grained pattern is shown in the illustration. The lower roll *A* is 15 inches in diameter by 60 inches long, and is made with a cast-iron center built up to the required diameter with layers of paper hydraulically compressed. The top roll *B* is of the same size and is made of forged steel. The surface of the roll is engraved with a pebbled or grained surface to produce the desired pattern on the rubber surface of the cloth. The upper roll is adjusted vertically by screws *C* at each end and it is cored for steam and provided with steam connection *D*.

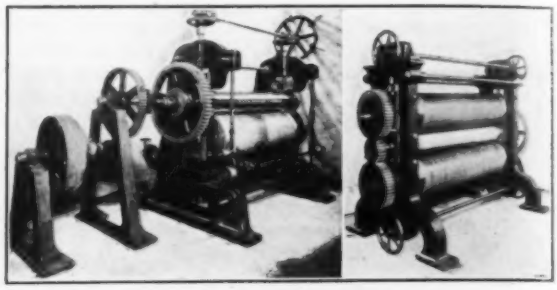


TWO-ROLL EMBOSSING CALENDER

The large gear *E* is keyed to the shaft of the lower roll and is driven from the usual spur pinion on the driving shaft under the bed of the machine.

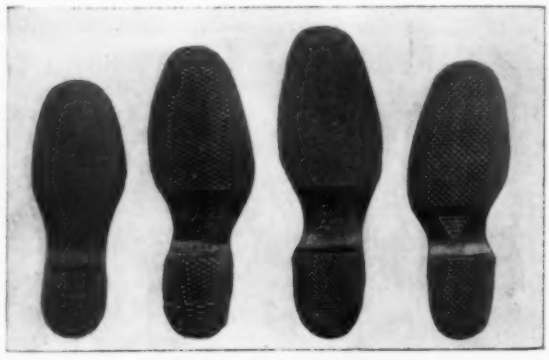
RUBBER FOOTWEAR EMBOSSING

Rubber shoe, boot and tennis soles are all embossed on calenders fitted with specially engraved steel rolls. So also are the uppers of rubber shoes whenever they are ornamented. The pebbled leg sometimes found on rubber boots is embossed either on the paper roll used in carriage cloth work, or on steel rolls fitted to an upper calender. Upper and soling calenders are either separate machines or made in combination.



STANDARD EMBOSSING CALENDERS

There are several designs of combined soling and upper calenders in use, but they are about the same in principle, varying only in the way the rolls are arranged.



SOLE AND HEEL EMBOSSING

A good standard type of machine is as follows: Three 12 by 30-inch chilled iron rolls are set horizontally in housings, and one 10 by 30-inch steel roll is set against the upper chilled roll. All of the rolls are bored out and arranged with stuffing boxes having goose necks connected with steam and water for controlling temperature.

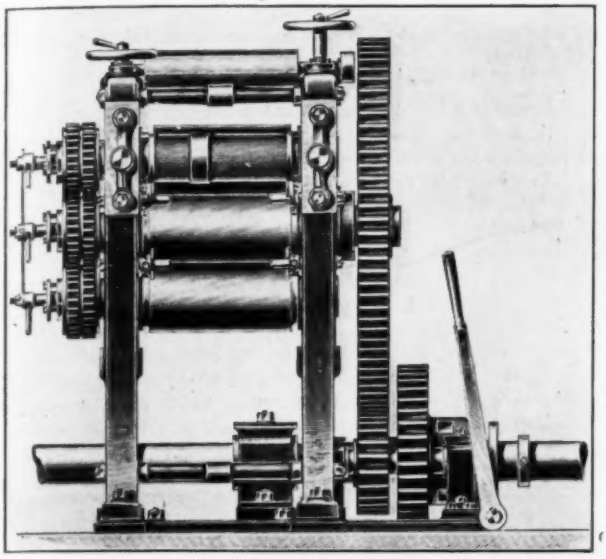
The middle chilled roll is a drive roll and is driven from the driving shaft underneath the machine. The lower chilled roll is driven from the middle or drive roll with gears on the same end as the drive gear, giving a friction on the bottom roll of 1½ to 1. The top chilled roll is driven by gears on the opposite end from the drive gear at even speed. The engraved roll is also driven at even speed from the even gear on the end of the top roll. The arrangement of the engraved roll in the housings is especially designed so that this roll can be easily removed and rolls of different pattern substituted.

It is well to have at least two speeds on an engraved upper or sole calender, as in running heavy material a slow speed is necessary to give best results. A good standard is 8 yards per minute for slow speed and 12 yards per minute for high speed. The machine described requires about 15 h.p. to operate. It is built regularly in the following sizes: 8 by 18-inch, 10 by 18, 10 by 26, 12 by 30 and 12 by 36; but a good average size is 10 by 26 or 12 by 30.

SHOE UPPER CALENDER

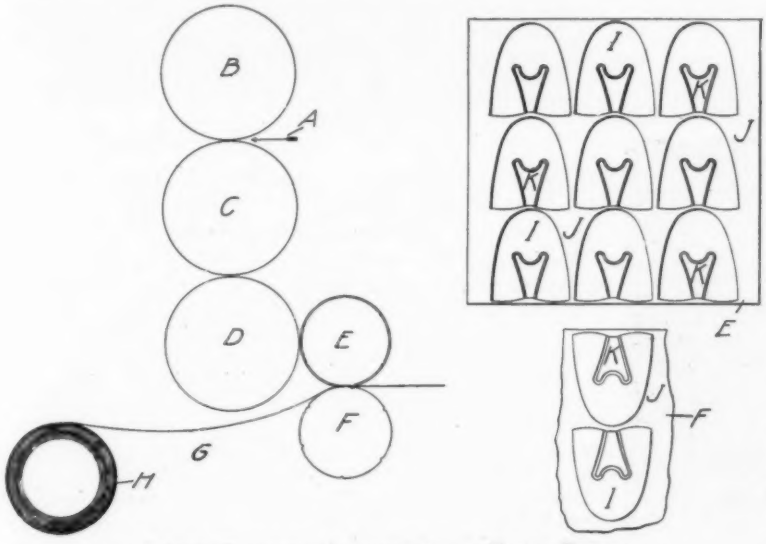
In the Pearce shoe upper calender the arrangement of the rolls is as follows: The rubber compound is fed at *A* between the

rolls *B* and *C*. It passes around roll *C*, then between this and the roll *D*, where it is sheeted to the proper thickness. Adjacent to the lower roll *D*, is a pattern roll *E*, in which the patterns are cut of the proper shape to form the shoe uppers. The roll *F*



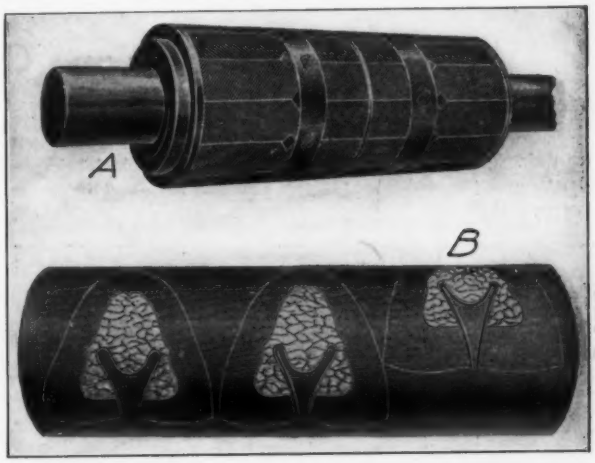
SOLE EMBOSSING CALENDER

has supplementary patterns raised above the surface to fit in those on roll *E*. These two rolls form cutting dies, which cut the patterns from the sheet of rubber. A strip of fabric *G* from the roll *H* passes between rolls *E* and *F* with the rubber. The rubber and fabric are pressed together over the area of the patterns; but since those portions of the rolls between the patterns do not contact, the two sheets are not united at these points, and are pressed together only within the limits of the patterns. The



PEARCE CALENDER—ARRANGEMENT OF ROLLS—DESIGNS

rubber scrap between the patterns is again mixed with the batch to be sheeted, and the only waste is the fabric cut from the edges of the patterns. The drawing on the right in the illustration shows the design of the surfaces of the pattern rolls *E* and *F*.



ENGRAVED EMBOSSING ROLLS—SOLES AND UPPERS

The rubber and fabric are pressed together between the surfaces *I*, while the material between the intermediate spaces *J* and *K* does not adhere and may be easily separated after passing the rolls.

GREATER SAFETY IN THE RUBBER FACTORY

That there is no basis nowadays for the old-time claim that work in a rubber shop is more hazardous and unhealthy than in most other factories, was demonstrated by Sidney M. Schott, of Morgan & Wright, Detroit, Michigan, in an address given at the meeting of the Rubber Division of the Ninth National Safety Congress held in Milwaukee, Wisconsin.

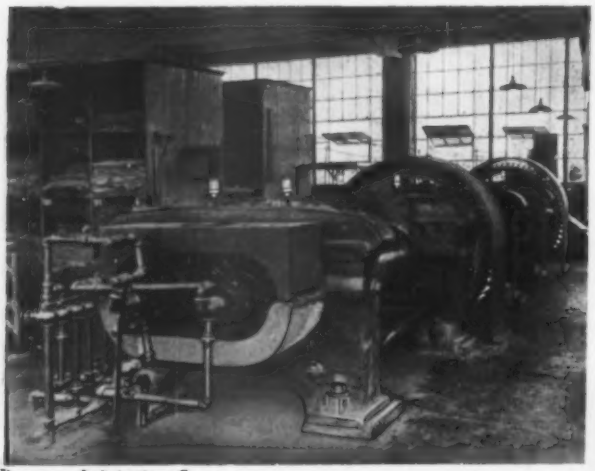
Rubber manufacturing concerns, from the president down to the humblest employe, are learning that safety pays, and an intensive campaign for safety, started more than a year ago under the auspices of the Rubber Division, is already bearing good fruit. The successful executive today is the one who insists upon all processes and machinery being made as safe as possible, even going to the extent of refusing to buy equipment that lacks all possible safeguards.

Accident statistics are being carefully standardized so that causes can be more definitely determined and proper remedies applied. Firms now engage in friendly rivalry to see which will produce the best percentage record of improvements in casualty lists. Workers are being educated with bulletins showing how the lost-time and minor accidents may be easily avoided; and the Rubber Division is preparing standard safety rules for mill and calender rooms, tire-building rooms, cement shops, etc. The same division has made recommendations as to the best types of floors for mill and calender rooms and is working on standards to insure the safe working of these machines. Knowing that the larger organizations are well able to take care of themselves in the matter, the Rubber Division is making a greater effort than ever to enlist the interest of and assist the smaller concerns which need guidance and hearty cooperation.

DECLARED EXPORTS FROM BELIZE, BRITISH Honduras, to the United States amounted to $3,035,459 in 1919, $1,961,128 of which was the value of 2,878,579 pounds of chicle, while in 1920 exports amounted to $3,726,029, of which were 3,411,466 pounds of chicle valued at $2,392,060.

Rubber Mill and Calender Lubrication

THE power transmissions and heavy machinery employed in modern rubber factories for washing, mixing, warming and calendering require careful selection of suitable lubricants, because of the excessive weight of the moving parts and the severe load conditions.

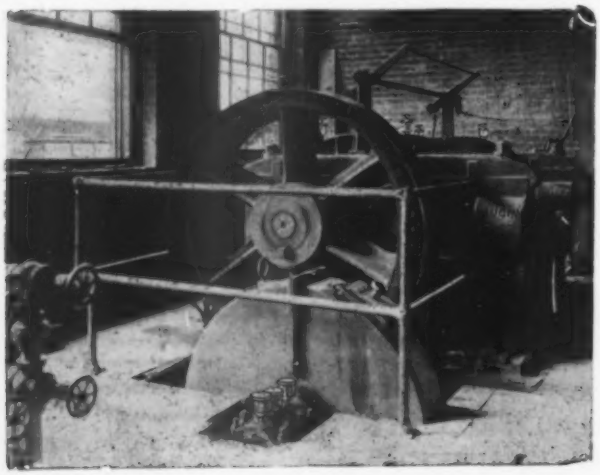


Keystone Lubricating Co.
MILL EQUIPPED WITH SPRING GREASE CUPS ON ROLL BEARINGS

Before the introduction of the present heavy types of mills and calenders the use of oils for lubrication was the general practice. It is doubtful if this was ever good practice, even on the relatively small mills and calenders of years ago; certainly, it cannot be rated as good practice today, because practically all oils and most greases thin down so readily under present working conditions of speed and pressure that without constant attention and frequent renewal of lubricant excessive frictional heat will develop, with danger of fire and injury to the machinery.

BEARINGS

Bearing troubles come from many causes. Among these are: poor alinement, improper grooving, inefficient lubrication, too great pressure per square inch of bearing area, inferior bearing metal, scored bearings, etc. The elimination of this list of mechanical defects must precede efficient lubrication, which will then depend on proper choice of the lubricant to meet the conditions of speed and pressure.



Keystone Lubricating Co.
RUBBER MILL SHOWING GRAVITY CUPS AND HAND COMPRESSION GREASE CUPS

VALUE OF THE LUBRICANT

The value of a lubricant lies not only in its capacity for reducing the frictional load under moderate bearing pressure, but also in developing a low coefficient of friction under severe loads. Such lubricants have been developed for heavy machinery of every type, in the form of special greases, applied by means of suitable feeding cups.

GREASES

Originally, the ordinary lubrication greases were little more than soft soap containing a filler such as wax, paraffine, rosin, rosin oil, talc, clay, graphite, etc., having little or no lubricating quality. Many greases are made wholly or in part from animal fats which may become rancid and very offensive. Such greases are usually highly scented with oil of myrbane, which smells like almond oil, to disguise the odor arising from this cause. Pine petroleum grease and other semi-solid lubricants have been found by test to possess the greatest relative capacity and lubricating efficiency under various bearing pressures.

Keystone Lubricating Co.
RUBBER CALENDER EQUIPPED WITH GRAVITY GREASE CUPS

RUBBER MILL APPLICATIONS

Driving gears and reduction gears require a grease not too light in density that will not be thrown off by centrifugal force at the operating speed. Such greases will possess unusually tenacious lubricating properties and maintain their original densities under the severest operating conditions.

Cleanliness is a vital feature in the lubrication of rubber mill machinery, as misplaced lubricant frequently comes into contact with the rubber, resulting in injury and loss. Trouble of this sort may be overcome by the use of specially designed cups feeding by gravity or pressure according to the density of the grease used.

In the case of ordinary rubber mills grease pockets are sometimes used in place of automatic spring cups. In order to secure adequate and efficient distribution of grease over the contact surfaces of bearings it is vitally important that attention be given to the grooving of the bearings.

The illustrations show the application of both gravity and pressure types of grease cups to rubber mills and calenders, which today has practically become standard practice.

Repairing Rubber Gloves and Mittens—IV[1]

A New and Valuable Line for Repairmen

Care and Use of Rubber Gloves—Two General Classes—Surgeons' Rubber Gloves—Hospital Glove Repairing—Applying Surgeons' Gloves—Sterilizing Rubber Gloves—A German Invention

CARE AND USE OF RUBBER GLOVES

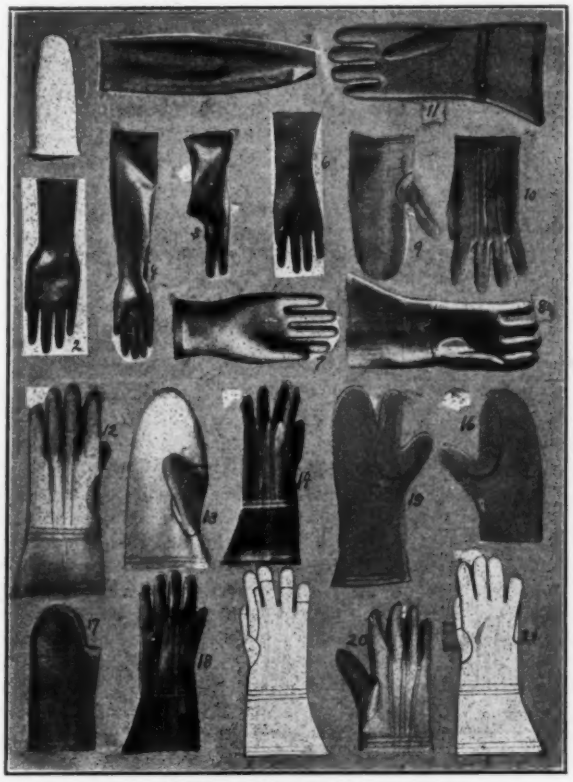
CONTRARY to a popular notion, rubber gloves will give good service and last a long time if given reasonable care, as manufacturers and repair men well know. Glove makers advise dealers to look over their stock every week, and to dip their rubber gloves in warm water and to roll them in the hands. This simple treatment not only makes the goods look more attractive to customers, but actually adds to their life, pliability, and preserves their elasticity.

Users of household gloves are told that when putting gloves away they should be carefully cleaned and dusted with starch or talcum powder. They are cautioned, too, against using any oil, as many oily substances ruin rubber. Glycerine, however, is quite harmless.

Rubber gloves should be worn one size larger than kid gloves. In putting them on, tearing may be avoided if the gauntlet is turned back a couple of inches and then, by seizing this double thickness, the glove can be drawn over the hand. In removing gloves they should never be pulled by the fingers, but rolled backward until the gauntlet reaches the finger tips. The glove thus turned inside out can easily be blown back into its original shape, if it is the household, or surgeons' type.

TWO GENERAL CLASSES

Rubber gloves divide themselves into two general classes, light and heavy. The light dipped glove is made on porcelain forms dipped in rubber solution many times and vulcanized before taking off the form. These are used by surgeons, nurses and, to a degree, in the household. As these sell often as low as 30 cents a pair, it is hardly worth while attempting to repair them, except in an emergency, when it can easily be done.



TYPES OF RUBBER GLOVES

(1) FINGER COT. (2) SURGEONS' GLOVE. (3) SURGEONS' SLEEVE. (4) OBSTETRICAL GLOVE. (5) 3-FINGER SURGEONS' GLOVE. (6) HOUSEHOLD GLOVE. (7) ELECTRICIANS' LIGHT GLOVES. (8) ELECTRIC LINEMEN'S GLOVES, HEAVY. (9) MOTORMEN'S MITTENS. (10) CEMENT WORKERS' GLOVES. (11) DRIVING GLOVES. (12) FIREMEN'S GLOVES. (13) FIREMEN'S MITTENS. (14) TANNERS' GLOVES, GAUNTLET. (15) TANNERS' 1-FINGER MITTENS. (16) TANNERS' MITTENS. (17) MERCURY-WORKERS' MITTENS. (18) X-RAY WORKERS' GLOVES, GAUNTLET. (19) ACID-WORKERS' GLOVES, TIPS REINFORCED. (20) ACID-WORKERS' SHORT GLOVES. (21) CYANIDE-WORKERS' GLOVES.

SURGEONS' GLOVES

The finest article in rubber gloves is the kind worn by surgeons. The best grade is made by dipping porcelain forms in pure Pará rubber solution, after which they are carefully vulcanized, the aim of the makers being to get gloves in various sizes to fit the hand perfectly and to obtain a membrane that, while tough, will yet be thin and pliant enough not to interfere with the wearer's sense of touch. They are, of course, seamless and the wrists are usually reinforced with rubber tape or cord. The gloves not only afford the operating surgeon practically perfect immunity from infection and save him repeated scouring of the hands with powerful antiseptics, which sometimes induce eczema, but they also safeguard the patient from infection.

Some surgeons' gloves are made quite smooth and others have a finely pebbled surface by means of which a surgeon may get as firm a grip on instruments, threads, ligatures, etc., as with the bare fingers. These gloves come in sizes from 6 to 11, inclusive, in light, medium, and heavy weights, and while most of them are wrist length, some are made to cover also half the forearm. For special uses, surgeons' gloves are made in three-finger styles—thumb, index, and middle fingers. For obstetrical operations, gloves are made 16 inches long, and extra sleeves, 16 and 18 inches, to fit from wrist to shoulder, are also provided. A patented surgeon's glove is made with allowances for the knuckles, thus preserving the "cuticle touch." Gloves similar to surgeons', but a trifle stronger, are also made for nurses, internes, midwives, and others, where the sense of touch need not be very keen. These gloves range in size from 6½ to 9 inclusive, and cover the wrist well.

HOSPITAL GLOVE REPAIRING

Repairs are made to surgeons' gloves in some hospitals by attendants, who cut suitable patches from old, torn gloves, and affix them to reparable gloves with ordinary rubber cement. While exacting physicians may not use the mended gloves, the latter serve many useful purposes, nevertheless, in big institutions.

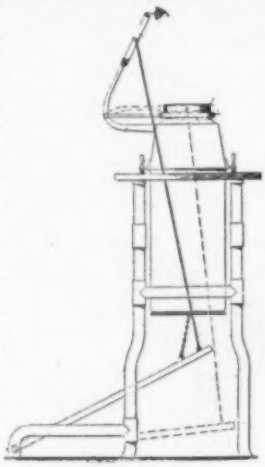
APPLYING SURGEONS' GLOVES

Surgeons' gloves in many large hospitals are often thrown away as useless after one or two operations. After the strain of a severe operation a surgeon will impatiently tear the gloves from his hands, when they could be saved from damage by either of two modes of removal. One is opening the glove at the wrist and allowing water from the faucet to flow into the glove; and the other way is to roll the glove downward from the wrist until it comes off the hand inside out. The turning or reversal makes the right hand glove a left-hand one, and vice versa, and equalizes wear. The gloves should never be pulled by the fingers.

In many hospitals thin gloves are frequently torn by surgeons while putting them on. To avoid this and to expedite the work of surgeons in speedy operation, a British inventor has devised a simple apparatus which either a surgeon or a nurse may operate. Referring to the illustration, the wrist part of a glove is

[1]Copyrighted by Henry C. Pearson. Continued from THE INDIA RUBBER WORLD, May 1, 1921, pages 567-570.

stretched with forceps over the neck of the cylinder, and is then engaged with the lower one of the rings. By depressing a treadle the air in the cylinder can be partly exhausted and the unclamped part of the glove is drawn inward and inflated. The treadle at the same time brings down an arm carrying the second ring, which snaps upon the first. When the treadle is released the arm carries up with it the rings holding the fully opened-up glove ready for the surgeon's hand. Often the glove is made easier to put on by being dusted while distended in the cylinder neck.



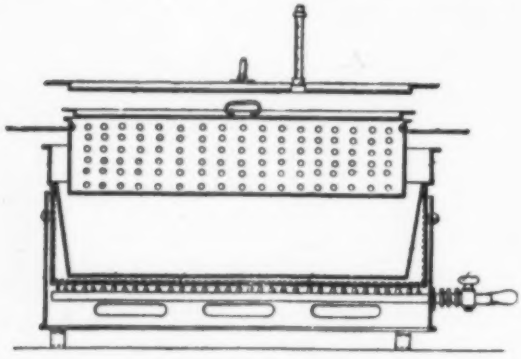
MACHINE FOR APPLYING GLOVES

STERILIZING RUBBER GLOVES

Oversterilization by prolonged boiling is the commonest cause of damage to surgeons' gloves. The makers suggest limiting the boiling to two or three minutes, after removing powder and sticky material, but often hospital attendants think that because infected fabrics should be exposed to 20 pounds of steam for 20 minutes, surgeons' gloves should receive equally drastic treatment. Bacteriologists say that the exposure of rubber goods to live steam for disinfection is rarely needed, and suggest that steeping surgical rubber articles in a 2 per cent formaldehyde solution be substituted for the destructive sterilization by steaming.

A GERMAN INVENTION

A German inventor has patented a device for sterilizing rubber surgical goods in hot glycerine. The articles and the glycerine are placed in a wire tray contained in a small metal trough that is then covered and heated. After 10 to 15 minutes when the temperature of the glycerine has been raised to 110 or 115 degrees C., one of the two gas burners is shut off, leaving the other to maintain an even sterilizing temperature for a further fifteen minutes. The case inclosing the trough has double walls with several layers of wire netting between them to distribute the heat evenly and prevent decomposition of the glycerine which occurs at 300 C. by excess of heat in any one spot.



GERMAN GLOVE STERILIZER

In a subsequent article the methods used in repairing the various types of rubber gloves will be described.

A NEW FIRM FOR FOREIGN BUSINESS CALLED THE NISSHIN Trading Co. has been established in Osaka, Japan. The rubber department will handle boots, overshoes, toys and brushes.

INTERESTING LETTERS FROM OUR READERS

THE TIRE MERCHANT CONCENTRATES

TO THE EDITOR:

DEAR SIR: The progress made in business methods by the great majority of tire dealers in the past few years has been a source of a great deal of satisfaction to the tire manufacturer, and especially so just at the beginning of his new year which has all the indications of being one of the largest years that the tire industry has experienced.

The tendency of the live, energetic tire dealer to concentrate his efforts on one or two makes of tires was impressed on my mind very forcibly during a recent trip through this territory. It has not been so very long since the tire dealer felt that, to be a success, it was necessary for him to stock almost all makes of tires, so that he would be in position to give to the motorist the tire that he asked for. The dealer of that day did not practice salesmanship, but followed the line of least resistance and filled the orders of his customers. Today, the energetic tire dealer is picking out one or two of the quality tires on the market, and concentrating his effort on those lines, and his success in following this procedure has been most remarkable, not only from the sales standpoint, but from the standpoint of raising his business in the eyes of the ultimate consumer, the motorist.

When the motorist goes into a dealer's store and finds that the dealer has a great variety of different makes of tires, he becomes confused and invariably loses confidence in that dealer, whereas, if the dealer is carrying one or two high-class tires, and concentrates his sales talk on those particular lines, the motorist is immediately impressed with the apparent sincerity of that dealer.

It is certainly false economy for a dealer to have a variety of makes of tires, for he has his money tied up in duplicate stock, and is wasting both money and space in his establishment. There was a time when the dealer thought that the heavy and wasteful stock was a matter of demand and supply, and to meet the demand it was necessary to have some of all the various makes of tires, until he finally found out that he could not afford it, that it was needless duplication of stock, was very poor practice from an investment standpoint, and also cut down his efficiency as far as service was concerned, and naturally the public suffered.

Today, we find the wise tire dealers selecting the line that will give the most service, at least cash. He is concentrating effort and using salesmanship with much better results. The dealers recognize the fact that the motorist has ceased to be interested in the so-called cheap tires and is now interested only in a quality tire at a fair price—a product that will give him value for the money expended. In other words, the motorist is interested in tire mileage.

N. E. WEST.

Los Angeles, California.

THE QUESTION OF TUBING OR CALENDERING HEEL STOCK

TO THE EDITOR:

DEAR SIR: The quality of the product of a rubber article would not be different molded from the same stock whether run on the tubing machine or slabbed on the calender. Technically, each method of stock preparation has its advantages dependent on the ultimate form of the object molded. The controlling consideration is most frequently that of cost. For example, a perfectly good heel may be prepared by tubing machine or calender, but a large producer would naturally employ the method of slabbing the stock on the calender and dieing out the heel shapes to fit the mold cavities, because this method admits of greatly increased weight of output and lowers cost. The calender method, too, affords an opportunity for uniting different grades of stock in the same slab if desired.

SUPERINTENDENT.

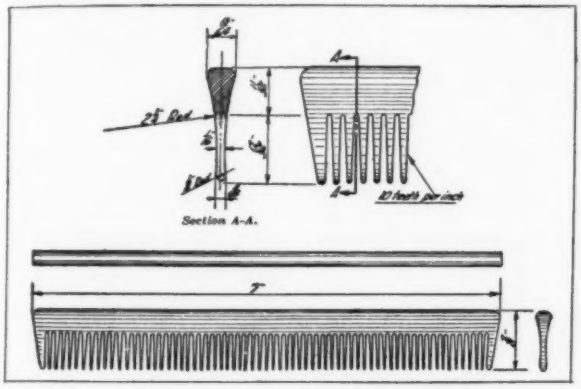
Manufacture of Hard Rubber Combs[1]

By William Roberts[2]

THERE are thousands of different styles of combs, the standardization of which is quite impossible, as the consumer is always looking for something new and the manufacturer has to cater to the fancies of the trade. Every customer has his own specifications and ideas. Even the United States War Department prescribes specifications for the combs to be supplied to the Government. There are dressing combs for men and women; special combs for barbers; pocket combs and fine-toothed combs in a great variety of styles. Hard rubber comb making is a highly specialized industry, requiring expert knowledge and special machinery.

PREPARING AND ROLLING THE STOCK

The compounded stock is first warmed on a mill and then calendered, after which the rubber sheets are plied up on a drum



CONSTRUCTION OF GOVERNMENT RUBBER COMB

to obtain the proper thickness and eliminate air pockets or blisters. The warm stock is next rolled in pieces approximately one yard square, between two sheets of tin foil approximately .015-inch thick. This requires a great deal of care and attention. An iron-top, steam-heated table is necessary for this work, with a large iron roller ranging in weight from 1,200 to 2,000 pounds, depending on the thickness of material and the finish that is required in polishing the comb. First, one sheet of tin-foil is applied and then the other, care being taken not to let the roller rest too long at any one place, as it is likely to make ripples or slight grooves. This will cause trapped air between the tin-

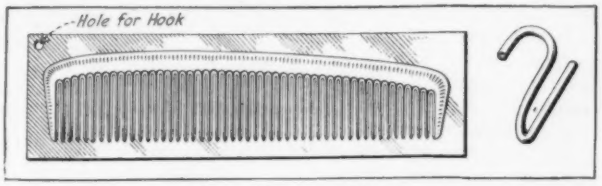
STANDARD RUBBER COMBS

foil and the material and may mean a blemished comb. It also results in unevenness in the gage of the stock and will undoubtedly be the cause of scrapped finished material.

Mechanical devices are used by some manufacturers but the principal manufacturers still use the hand method which requires two men to operate the rollers and through experience they become very skilful in this work. The sheets of tin-foil with the rubber stock between are then cut into rectangular blanks of the proper size. This operation is done on a special cutting and shearing machine, after which the pieces are ready to be formed into the shape of comb required.

THE COMB MOLD—FORMING AND CURING

The forming die is made a little larger than the required size and shape of the finished comb. Hydraulic power-presses are

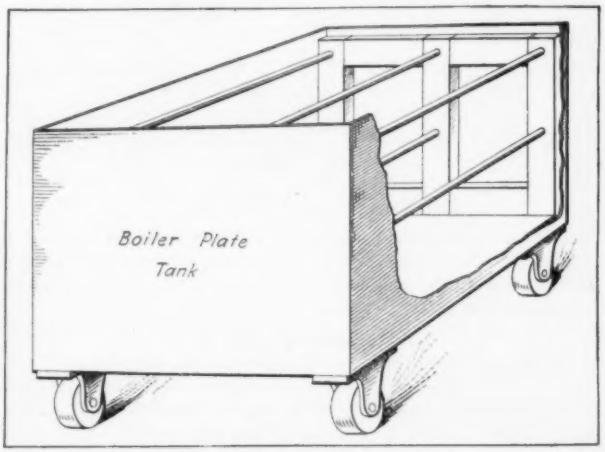


COMB MOLD AND HOOK

generally used. The blanks of compound with layers of tin-foil on the outside are then placed in the die and formed, the tin-foil taking on the shape and form of a comb and acting as a mold. Holes are pierced in one corner of these comb molds through which hooks are placed and the molds are hung on a frame built inside a rectangular tank-truck made of boiler plate. The tank-truck is next filled with water and rolled into the heater where the combs are cured or vulcanized for about 12 hours under 75 pounds steam pressure.

TRIMMING THE FLASH

After vulcanization the tank is drained and the tin-foil stripped from the hard rubber comb blanks. The thin flash of hard rubber



CURING TRUCK-TANK

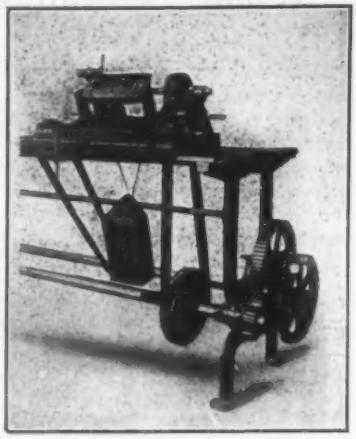
around the form is then removed, various devices being employed for this purpose. The three principal methods are: (1) Stacking a dozen combs together and whacking them with a flat wood stick, the flash being so thin that it readily breaks off; (2) Grinding off the flash on a disk grinder; (3) Grinding the two long sides at once between two grinding wheels. The centrifugal force of the wheels carries the blanks through a specially formed chute into a box. The ends are then finished off individually on a disk grinder, and the comb is ready to have the teeth cut.

[1]This article may not be reprinted without permission of the author, who reserves all publication rights.

[2]Engineering School of Drawing, Springfield, Massachusetts.

COMB-CUTTING MACHINES

The American machine shown herewith feeds and stops automatically. The weight draws the comb down on the saw that cuts the first tooth, and a cam then raises the comb from the saw which is carried along the space for one tooth by a cam and rack. This continues until all the teeth have been sawed, when the machine stops. The rack and cam can be taken out and others substituted if a different number of teeth to the inch are to be sawed.

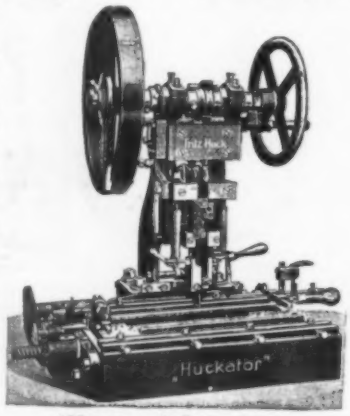


DRESSING-COMB SAWING MACHINE

These machines are usually operated in gangs, 15 machines being operated by one operator who can turn out under favorable conditions 1,200 to 1,500 dressing combs a day.

A GERMAN MACHINE

This German comb-cutting machine is claimed to be self-acting. It cuts fine and coarse teeth with one pair of knives without interruption. Both edges of the teeth are completely cut automatically. Furthermore, the machine throws out the comb when finished. It is recorded that 12 dozen combs each 8½ inches long can be cut in one hour, and that one man can easily handle two of these machines which work at 90 revolutions a minute.



"HUCKATOR" COMB CUTTER

In making a toilet comb with fine and heavy teeth the length of the teeth is measured upon an adjustable ruler. The width of the corner teeth is regulated by a special adjuster. After the plate is inserted, the machine is turned by hand a few revolutions until the knife has found the proper position for cutting the corner tooth. The first comb is cut and the machine is adjusted for further work.

RUBBING-DOWN PROCESS

To give the combs a very high luster, a rubbing-down process is employed. Dried corn husks are used to make large buffing wheels, and this is quite an art in itself. These wheels are then treated with water and coated with fine rotten stone. The comb is next applied to this wheel in a manner similar to applying the comb to a flannel buffing-wheel when polishing. This is dirty work and the labor turn-over is somewhat large. After the corn husk wheels are used for several days a very strong sour odor permeates the atmosphere which adds to the disagreeableness of the task. It is not, however, injurious to the health, as various tests and experiments by able health authorities have shown.

POLISHING AND FINISHING

The combs are then washed in plain water and sent to the buffing and polishing department, where girls are employed. The buffing and polishing wheels are made of large flannel disks and the outside diameters of the assembled wheels are treated with oil, fine rotten stone, and rouge. The combs are then inspected for evenness of teeth and luster and sent to the stamping or marking room where the manufacturer's or customer's name is stamped thereon. This is done with a kick-press, the stamp being electrically heated. When letters in gold are required, the impression is first made and a sheet of paper with a very thin coating of gold is inserted under the die which is brought down on the comb again. The combs are then packed in boxes for shipment.

POSSIBLE SHORTAGE IN WORLD'S COTTON SUPPLY

That a reduction in acreage, such as proposed for cotton planters in order to bring up the price level of the staple, would be a grave mistake, is the view of some of the best-informed experts in the industry. It is pointed out that were the acreage reduced one-third, as some advocate, or from 35,504,000 to 23,670,000 acres, the approximate yield on the past five years' basis would be 8,000,000 bales. Such a crop could not fail to be inadequate, despite the surplus carried over from the current season, to meet even the present slackened demand. All signs indicate a very decided and early improvement in business this year in both the tire and general textile trades, and a demand for probably 14,000,000 bales in the 1921-22 season. As this demand would have to be met almost entirely from the crop planted this spring, it is not hard to see what would happen were acreage reduced as agitators unwisely advise.

For five years American cotton prices kept steadily mounting until in 1920 they reached the highest level known since the Civil War; and in the same year they dropped to the lowest level known in the country's history. Naturally the violent reaction hit many planters and dealers hard, and there has been much casting about for ways and means both to mitigate their plight and to strengthen their position. Some of them decided that the best way out of the difficulty would be to curtail the crop in order to get higher prices, overlooking the fact that they might be inviting trouble through a federal inquiry as to "combinations in restraint of trade."

Much sympathy is expressed for the planters who have suffered considerably from unfavorable weather and boll-weevil depredations, coupled with higher labor and living costs; but clear-sighted students of the situation contend that the remedy for the adverse conditions does not lie in retaliation on the mill owners who failed to keep on buying at high prices as their own trade fell off, but in a sensible get-together policy. Mill owners need an ample supply, and planters need a fair price. Hence conferences are advised at which both producers and consumers may frankly discuss the status of the industry and devise some cooperative course that will be mutually helpful.

Cotton prices are low, abnormally low, but the far-sighted planter must realize that the whole world will soon be clamoring more than ever for cotton, and that the wise ones who can meet the demand will be the ones who will profit most, not the resentful or the faint-hearted who are planning to plant less. He may, too, take some comfort from the speculator's axiom that booms always begin in gloom and end in gladness.

HERMETIC AIR BAG

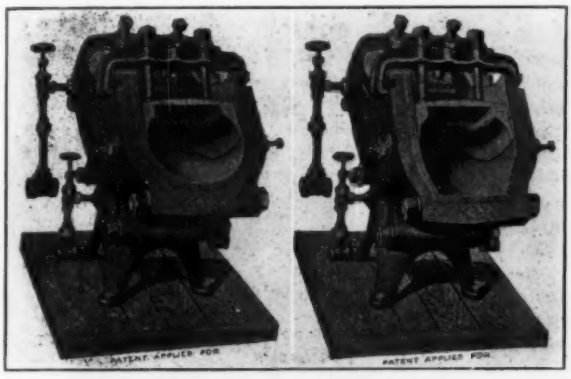
A new construction of air bag for use in curing straight-side automobile tires is the bag built of special rubber compound upon a patented flexible air container. Another patented feature is the hard bead wedge protected and bound by fabric cured to the rim side of the bag. There is no heavy splice in the construction. Uniform pressure, expansion, and compression are secured by this construction. Compression at the beads is due to the patented bead wedge.—Cupples Co., St. Louis, Missouri.

Pneumatic Truck-Tire Repair Vulcanizers

MANUFACTURERS of tire repair equipment have consistently kept pace with the development of the giant pneumatic tire. There is today a great variety of types of equipment for vulcanizing pneumatic truck tires. There is also a great diversity of opinion in respect to the success of different methods of adjusting molds to fit more than one size of tire. The object of this article is not to point out the best method of vulcanizing truck tires, or the molds which will best serve present and future requirements of the tire repair man, but to bring to the attention of our readers the development of truck tire repair equipment.

AKRON-WILLIAMS EQUIPMENT

The Akron-Williams pneumatic truck-tire sectional vulcanizers are made in five sizes, to handle 6, 7, 8, 9 and 10-inch tires, in two types—one for round tread and the other for flat tread tires. These are assembled in two types—one mounted on short legs and fitted to take its steam supply from an outside source or separate steam connection, the other equipped so that it will generate its own steam. The self-contained, steam-generating, sectional vulcanizers are provided with boiler, safety valve, water gage, steam gage, filling funnel, valves, etc. The boiler is of tubular construction, and can be equipped so that either gas or gasoline can be used as fuel. One pair of crucible steel straight-side bead molds is furnished with each sectional vulcanizer. The split mold construction is used, giving separate steam circulation to either side of the sectional cavity, thereby permitting live steam to enter one side of the cavity at a time, or both sides at once. A distinctive feature of these molds is the two-screw pressure yoke, one screw applying on either half of the bead molds, assuring more positive and evenly distributed pressure than is possible with one screw.



ROUND AND FLAT TREAD VULCANIZERS

INSIDE PATCH VULCANIZER

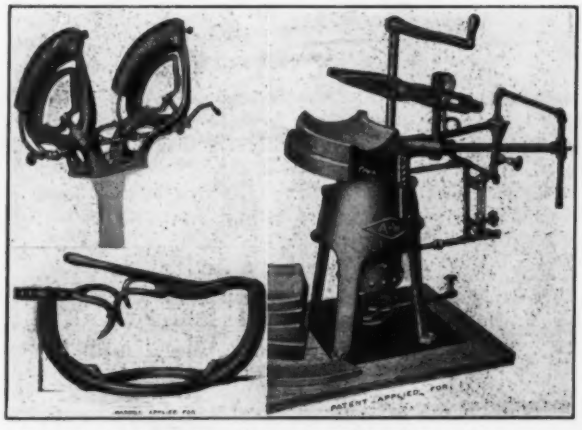
The inside patch vulcanizer should be used in conjunction with sectional vulcanizers. The best vulcanizing results are secured when the tire is placed on an inside patch vulcanizer and partially cured and then fitted into the sectional vulcanizer to complete the cure. These vulcanizers are furnished in five sizes the same as the sectional vulcanizers, and fitted with either left or right-hand brackets which can be mounted directly on a table or stand without building special support. The wrap-tightening device gives effective pressure and repairs quickly with little effort on the part of the operator.

SIDE-WALL VULCANIZER

The side-wall vulcanizer is built in two types—one with a boiler to generate its own steam, the other to take its steam supply from an outside source or separate steam connection. Five side-wall plates, carefully machined, go with the equipment to care for the five sizes of tires. The clamping arrangement gives positive pressure on the repair by means of an iron plate on a sand-bag inserted in the tire. The sand-bag is not furnished with the equipment. Adjustable hooks at both ends of the steam plate can be hooked over the lower bead of the tire when in position and the pressure-arm crank, by reversed movement, can then be utilized in spreading the beads apart so that the sand-bag and iron pressure can be easily inserted. This vulcanizer serves for inserting inside and outside patches and repairing side-wall abrasions.

TIRE-BEAD SPREADER

The tire-bead spreader is easily adjustable to any size of truck tire, spreading the beads, without injury to the tire, as far apart as is desired and locking against the back-pull. There is no cross-arm or obstruction between the beads; they are held apart from the outside. The spreader bolts to the floor. Spreader hooks are placed over the beads without difficulty, and the spreading is accomplished by simply pulling back the lever. It is also a great help when inserting the inner tube.



BEAD SPREADER—INSIDE PATCH AND SIDE-WALL VULCANIZER

AKRON-WILLIAMS TRUCK TIRE EQUIPMENT

THE WESTERN VULCANIZER

The Western one-fourth-circle molds are designed with the idea of fitting all types of treads, therefore one type mold has the bottom with only a slightly curved surface on the tread and an "O. G." curve to the side-wall, which practically fits all types of truck tires after they have worn down a little—and the other mold is the ordinary round-bottom type. These molds can be adjusted to different sizes, should any radical change occur in the oversize, by widening or narrowing the spaces in the bottom of the mold. The spacer is of the same metal as used in matrices and bead plates, and actual test has found that the spacer has the same temperature as the sides of the molds.

The six-inch pneumatic truck-tire mold is designed for both sectional work and retreading in anti-skid designs, and can be equipped with anti-skid matrices in both diamond and rib tread designs.

As the percentage of seven and eight-inch tires taken together is only about equal to that of the six-inch tire alone, a combination seven and eight-inch mold without a reducing shell has been produced. The mold is split in halves, having two separate steam chambers, and a spacer is used between the halves to change the

sizes. The halves are held together firmly by four large bolts. This mold localizes the heat in either one side or the other when

WESTERN 7 AND 8-INCH COMBINATION MOLD

curing side-wall, rim cut, spot or bead jobs. One side of the mold is stationary, bolted to the feet, and the other side adjustable horizontally so as to be changeable from one side to the other.

This vulcanizer can never become obsolete in size should tire manufacturers increase or decrease the percentage of oversizes on seven and eight-inch tires.

MILLER TRUCK TIRE MOLDS

The Miller adjustable sectional vulcanizers handle casings from 5 to 8½ inches in size. A special patented feature of these molds

MILLER ADJUSTABLE VULCANIZER

is a steam-jacketed sectional cavity having air-cooled flanges and adjustable bead molds or bead straps working up and down on the straight-side walls of the sectional cavity. In this manner several different sizes of tires are fitted into the same cavity without using reducing shells. The bead molds which fit into the same cavity are so designed and constructed that they will take in different styles of beads on different sizes of tires in the same cavity. Special bead molds are furnished to repair different styles, as regular clincher, Q. D. clincher or straight-side beads. The vulcanizers are steam-jacketed all around the cavity and are cast in one piece. This method of direct contact with hot walls insures a more even cure on the rubber. The bead molds are made to fit old tires by simply sliding up a little higher on the straight polished surface of the vulcanizer. They never pinch or wrinkle the fabric or damage the tire in any way. Quick detachable clincher tires are repaired with regular clincher bead molds.

The Miller sectional vulcanizers will repair inner tubes satisfactorily by clamping them on the straight surface in the cavity with two clamps which are furnished at an extra charge. The air-cooled flange is either attached or cast on. Boiler, steam-gage and pop-valve are furnished with all vulcanizers, two pairs of clincher and straight-side bead molds, base, and clamp. All sizes of one-cavity en bloc sectional vulcanizers are for steam line or with boiler and high stand for gasoline or gas burner.

ZWEBELL'S VULCANIZERS

The Zwebell S-8 vulcanizer is equipped with a split aluminum reducing shell which reduces the 8-inch mold to 7 inches, and then to 6 inches. One pair of straight-side bead molds are furnished with each outfit, also two spacers to be used when 7 and 8-inch tires are being cured. The S-8 combination sectional mold is furnished either without or with boiler. Factory tests show that this outfit will steam to 50 pounds in 50 minutes, but this will vary according to size of gas line and pressure of gas in different localities. The mold is drilled and tapped to be connected to a common steam line. Steam is admitted through one of the two ¾-inch openings in the side of the mold and condensed steam is returned to the boiler through the ¾-inch opening provided in the base of the pedestal. A 1¼-inch steam chamber evenly heats the mold. The length of curing surface of the 8-inch mold is about 32 inches, with 7-inch shell inserted the surface is about 30 inches, and with the 6-inch shell, about 28 inches. Instead of a pedestal, the mold is mounted on floor flanges if a generating plant is desired.

ZWEBELL'S S-8 VULCANIZER

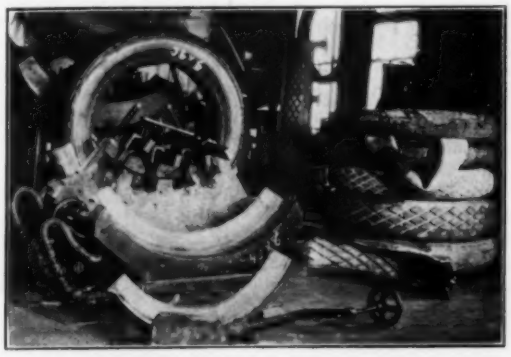
FREDD'S INTERCHANGEABLE MOLDS

Fredd's special all-size truck-tire mold is designed so that no matter how tire types change in the future, only two new tread plates need be gotten to bring that mold up to date. The mold is designed to handle repair work and retreading on all sizes of truck tires up to 48 by 12 inches.

Molds and parts are made interchangeable. Tread plates are furnished with the molds to cover every style of tire now on the market. A feature of this mold is the flat top bases on which the tread plates for either flat or round type tires are placed, and when retreading smooth, ribbed, or non-skid treads.

The base and tread plates are placed between the sides of the mold and held by bolts which pass through holes with metal around them. No gaskets are used. Steam hose connections are then made and the tire, with the air bag within it, is inserted be-

tween the sides. The bolts are then drawn up to the width that best fits the tire, then bead plates are placed in position, held by four bar clamps made with forked, hooked ends, wedge-shaped, having a tendency to slightly draw the top of the mold, yet not to tip when pressure screws are tightened. The 6-inch base takes 6 and 7-inch tire tread plates; the 8-inch base takes 8 and 9-inch plates and the 10-inch base takes the 10 and 12-inch plates.



FREDD'S ALL-SIZE VULCANIZER

This mold is one-quarter circle and can be used as a steam press when the base is entirely omitted. The base may be used as tube plates when not otherwise in service. Each part is drained and heated separately.

THE FISHER SECTIONAL VULCANIZER

The Fisher sectional vulcanizer has an inner steam core *A* over which the repaired section of the tire is placed. Pads are applied to fill the depressions of the non-skid design and two outer side-plates, *B, B*, are placed against the side walls and beads of the tire. Over these are placed three metal pressure bands or saddles *C, C, C*. The lower ends of these bands connect with six heavy bolts *D, D, D*, by which the bands can be drawn down and a strong pressure applied to the upper portion of the tire. Each band can be drawn down independently and any inequality in the thickness of the repair can be readily adjusted. After this operation, two specially designed screw clamps *E, E*, are placed in position and the side-plates *B, B*, are forced directly against the side-walls and beads of the tire by tightening the hand-screws *F, F*.

FISHER'S VULCANIZER

It will be noted in the illustration that the side-plates and the ends of the side-pressure clamps are carried on two heavy rods extending through and rigidly connected to the lower part of the mold. These rods connect the ends of the clamps and prevent their spreading, twisting, or shifting their positions, which are common troubles where ordinary clamps are used.

The combined forces of the bands over the upper portion of the tire and the side-plates at the side-wall and beads provide a complete pressure of any desired degree to all parts of the section and extending to the extreme points of the beads.

THE DUNCAN VULCANIZERS

The Duncan truck-tire mold is similar in construction to the four-cavity sectional mold and cures pneumatic truck tires in the time usually required, without the use of steam-bags on the inside of the tire or an additional cure over an inside vulcanizer. At present there are but two sizes: one for 5 and 6-inch tires and another for 7 and 8-inch tires.

DUNCAN'S MOLD

Matrices or reducing shells are not used in these molds, but the cavity is self-adjusting in construction. The cavity walls are sloping instead of straight up and down, allowing the plates to adjust themselves automatically to the exact size and shape of the tire. Bead plates extend down to near the tread line and protect the old side rubber from the excessive heat and always effect a perfect cure of the bead. The molds are constructed of special compound ammonia semi-steel.

This vulcanizer is declared to embody certain technical principles that enable a tire to be perfectly cured through, including a cord shoe, in one and one-half to one and three-quarters hours, with 45 to 48 pounds of steam, without the necessity of additional heat application on the inside of the tire. An air-bag only is used. The molds may be operated with gas, gasoline or steam-line connections. Where gas or gasoline burners are used, the equipment includes the steam generator.

"DRI-KURE" EQUIPMENT

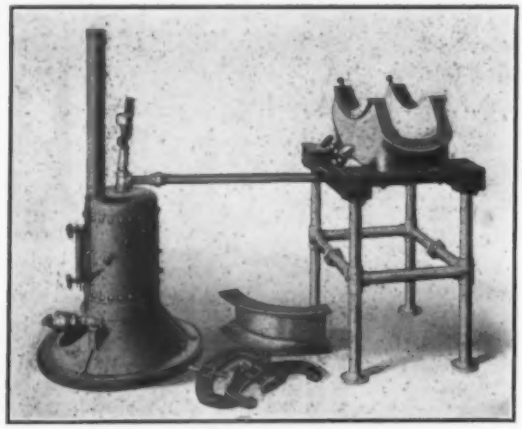
"Dri-Kure" sectional truck-tire molds are quarter-circle molds handling 6, 7, 8, 9 and 10-inch tires. They are equipped with inlet and outlet valves, clamps, wrenches, etc., as are all "Dri-Kure" single-cavity section molds. The steel clamping system makes this mold one of the strongest and most enduring. Both the molds and the bead plates are carefully and accurately machined and polished. The upright position of the molds decreases the usual time and energy expended on the putting in and taking out of heavy truck tires. Also the efficiency of steam-bags is increased as the condensation goes to the lower end and drains off. Wood end-blocks prevent mold marks at the ends of cures. Pipe legs with which these molds are equipped enable the user to change the height to suit his convenience or to suit a different installation. Bead plates are all made of electric steel. The plates are machined down to a knife edge, adding greatly to the appearance of the finished repair job as they leave no marks on the sides of the tires. Inside cure forms are made in two

"DRI-KURE" MOLD

sizes, namely: 3½ to 4-inch and 4½-inch up. These forms may be attached to section molds, retreaders or to a separate steam line.

THE HAYWOOD VULCANIZERS

Haywood giant truck-tire molds are made in 6, 7, 8, 9 and 10-inch sizes, with an absolutely smooth curing surface and ample steam space, and are supplied with clamps and bead plates. Either steam or air-bags may be used in making the cure. The molds are constructed with three separate steam chests so that it is possible to confine the heat to that portion of the tire being cured.

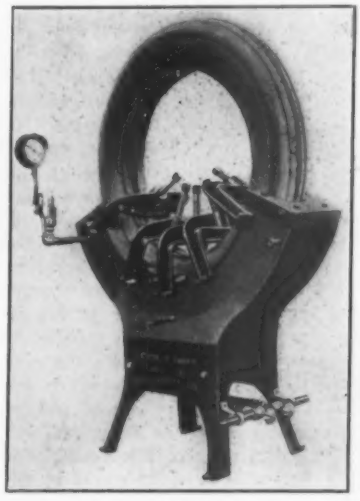


HAYWOOD'S MOLD AND GENERATOR

These molds are made for flat or round tread and can be attached to any steam line or mounted on individual stands.

THE BROWN VULCANIZERS

The Brown pneumatic truck-tire sectional vulcanizer is made in two styles, one for the round tread and one for the flat tread, the round tread being made in 6, 7, 8 and 9-inch sizes, and the flat tread in 6, 7 and 8-inch sizes. These molds are particularly useful for curing retread bands where it is not desirable to use the old method of curing in steam kettles. One pair of bead molds is furnished with each mold. Each tread style and size is made in four types: complete with gas burners to generate its own steam; complete less burners, to be connected direct to steam; complete with gasoline burner to generate its own steam; or complete with kerosene burner to generate its own steam.



BROWN'S VULCANIZER

The round tread 6 and 7-inch sizes are full one-quarter circle, while the 8-inch is almost one-third circle, being 42 inches in longitudinal length at the bottom of the mold; the same is true of the 9-inch size. The 8-inch size is used for retreading or vulcanizing retread bands, as flanges are cast on the sides of the molds and heavy steel clamps can be furnished for this work. Retreading can be done in four cures. One pair of bead molds is furnished with each mold. The 9-inch mold has no flanges on the sides and is used for sectional and band curing. The flat tread molds are full one-quarter circle, and one pair of bead molds is furnished with each mold.

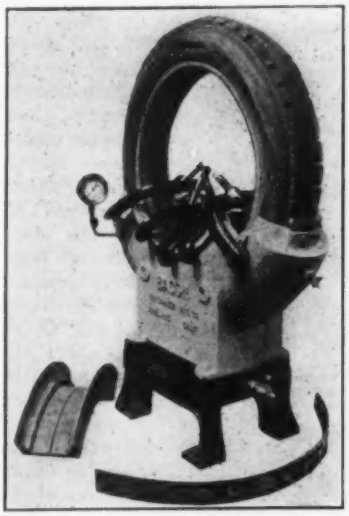
LOWELL VULCANIZER

The Lowell truck-tire equipment for vulcanizing pneumatic truck tires is in four full quarter-circle sectional molds. Models 26, 27 and 28 handle, respectively, 6, 7 and 8-inch tires of the flat tread type, while Model 21, equipped with reducing shells, handles sizes 6, 7 and 8-inch tires of the round tread type. This latter model also, with the use of negative pads, handles flat tread tires. Model 21 is equipped with two pairs of bead molds, inside curing core and core clamp in addition to the reducing shells. This model can be used as a self-contained unit, generating its steam by means of electricity, gas, gasoline or kerosene. It can also be attached to a separate steam supply. The other models are designed for attachment to a separate steam supply only. They are furnished with bead molds, two pressure blocks, air-valve and wrench.

LOWELL MOLD—MODEL 21

THE BACON VULCANIZERS

The "K" combination retread and sectional mold is for flat or round tread. Matrices in "Royal Cord," "All-Weather" or rib type treads can be furnished. Provision is made that the steam-bag employed in doing sectional work may be filled with steam from the mold. The 6 and 7-inch molds are equipped with an automatic gas regulator, radius rod, sand-bag, wrench, clamps, etc., as are the 8 and 9-inch molds. Where the cures lap, the tire is only semi-cured on the first heat, due to the arrangement of the cooling flange and matrix extension, and when the tire is turned for the next cure this portion is thoroughly cured. Bead molds are not included in the equipment of these molds. The sides of the central portion of the cavity are raised so that perfect results are obtained when using the mold for sectional work. The weight of the mold is 500 pounds.



BACON'S COMBINATION MOLD

WOBBLY WHEELS, BESIDES WEARING BEARINGS AND OTHERWISE racking the machine, have an equally destructive effect on tire treads. A slight wobble of only one degree actually drags the tire sideways 920 feet in each thousand miles. This rasping increases with the seriousness of the trouble. Such a condition is easily corrected and saves not only tires but the car from excessive strain.—*Miller News Service.*

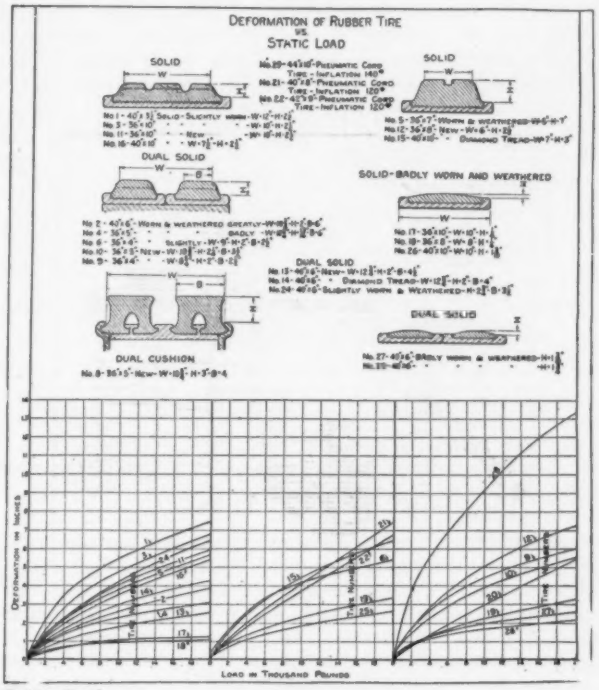
Truck Tires and Road Damage

THE relative effect of the various kinds of automobile truck tires used on highways under various conditions of stress is comprehensively shown in a recent report on motor truck impact tests.[1] The research work has covered a period of two years and has concerned itself primarily with better road design to meet the heavy traffic which the rapid extension of truckportation has occasioned since the war. Four factors have been dealt with by the Federal engineers, namely: impact, pressure or weight of the passing load, horizontal shear and tractive forces, and subgrade and soil conditions, the report on impact being the first available.

In dealing with impact, or the force with which a truck wheel strikes the road surface, it is explained that the injury to the road, and incidentally to the tire depends much upon the type, construction and condition of the tire. Impact will be less when the tire is new, full, and of good quality than when worn, flattened, or almost lacking in cushion. The true, so-called "cushion" tires have a decided advantage in reducing impact, and to such as have less than 40 to 50 per cent of the deflection of a pneumatic tire the writer would deny the name "cushion." Tire deflection is far more important in considering impact than width of tire or load per inch of tire width. Contrary to popular belief, a very wide but thin solid tire will give much higher impact forces than a narrow thick one.

Tire dimensions and deformations are shown in Fig. 1. For each tire a curve is drawn which gives the deflection or deformation under different loads.

Fig. 2 shows a comparison of the effect of tire equipment upon the value of impact. A 2-ton truck carrying a 2-ton load was used. Four different tires were each tested using in each case the speed as the independent variable. The comparison is shown with both the drop and the obstruction test. In the obstruction test the impact value (the ordinate) shows a considerable change with only a slight change in the tire deflection. The impact value, with all conditions the same except the tire, is the greatest for the solid rubber tires and the smallest for the pneumatic tire, the cushion tire giving an intermediate value. At low speed

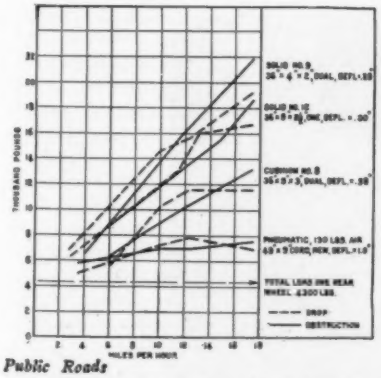


Public Roads

FIG. 1. STATIC LOAD VS. DEFORMATION OF RUBBER TIRES

three times, and the solids 4.3 to 5.1 times. In this particular case, the cushion tire gives an impact value of 63 per cent of the solid tire average, and the pneumatic only 36 per cent. The impact value for the pneumatic tire increases only slightly with the increase of speed.

COMPARISON OF TIRES



Public Roads

FIG. 2. TRUCK, 2-TON A—LOAD, 2 TONS

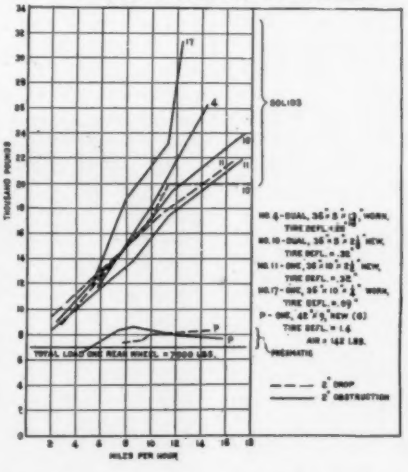


FIG. 3. TRUCK, 3½-TON P—LOAD, 4½ TONS

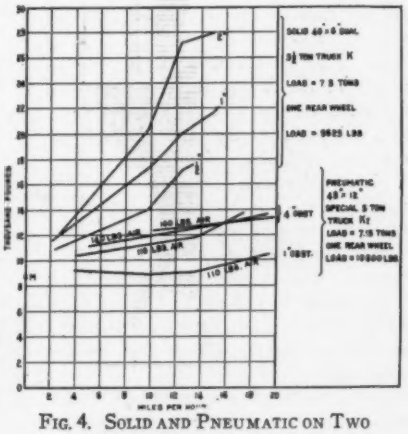


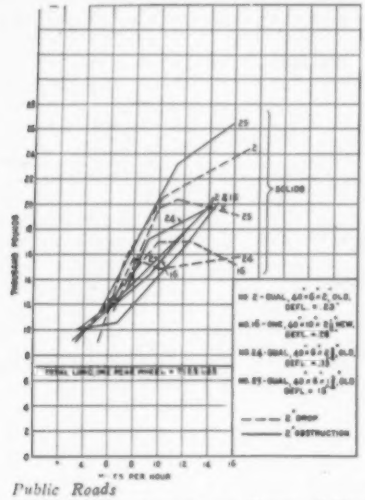
FIG. 4. SOLID AND PNEUMATIC ON TWO SIMILAR TRUCKS

the difference is not so great. At a speed of 17½ miles an hour the pneumatic tire gives an impact value of only 1.75 times the rear wheel pressure on the road surface, the cushion tire over

Fig. 3 shows a comparison of the effect of tire equipment. The truck was of 3½-ton capacity, loaded with 4½ tons, the unsprung weight being equal to 1,300 pounds. The total load at one rear wheel was 7,000 pounds. Here, it should be noticed that with pneumatic tire equipment the impact force was only

[1] "The Motor Truck Impact Tests of the Bureau of Public Roads," by Earl B. Smith, Bureau of Public Roads, in Public Roads, Vol. 3, No. 35, United States Department of Agriculture.

15 per cent greater than the actual wheel load. The four different solid tires which were used show very clearly the effect of the condition of the tire. Tire No. 17 gave some very high impact values even at 12 miles per hour. This tire was badly worn, having a thickness of only one-fourth inch above the rim. The other solid tires gave impact values somewhat in proportion to their deflection or condition. The results shown by tires Nos. 10 and 11 indicate the usual impact values that may be expected with good solid tire equipment, while the results shown by tires Nos. 4 and 17 show the increase or extreme values that may be expected from the same truck when the tires are in a badly worn condition.



Public Roads

FIG. 5. COMPARISON OF TIRES—5-TON TRUCK K—LOAD, 5 TONS

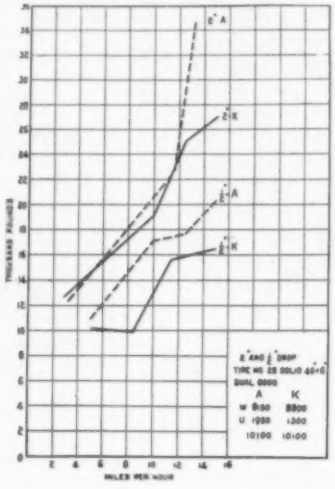


FIG. 6. COMPARISON OF TRUCKS VS. SPEED—TWO 5½-TON TRUCKS

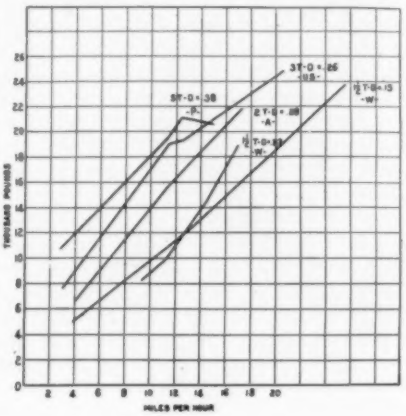


FIG. 7. COMPARISON OF TRUCKS—TIRE DEFLECTIONS—ALL 2-INCH OBSTRUCTIONS

Fig. 4 is a comparison between the effects of solid and pneumatic tires. The truck was 5½-ton capacity loaded with 7½ tons. This graph shows the very great cushioning effect of pneumatic tires in comparison with solid tires. In this case a 4-inch obstruction was used during the test with the pneumatic tires, and the effect was much less than when using a solid tire on ½-inch, or 1-inch, or 2-inch obstruction. The effect of the air pressure in the pneumatic tires upon the value of the impact force is also shown.

Fig. 5 shows a comparison of tires; that in general the magnitude of the impact force is dependent upon the condition and deflection of the tire. It shows graphically the wide variation in impact values that may be expected from the same truck equipped with tires of different conditions.

Fig. 6 shows a comparison between trucks. Two 5½-ton trucks were each loaded so that the total rear wheel load was the same in each case. Truck A had an unsprung weight of 1,950 pounds and truck K had an unsprung weight of 1,300 pounds. Both trucks were equipped with the same set of tires. This comparison shows the effect of unsprung weight upon the impact value. It is very clear that the truck having the lighter unsprung weight produced the smaller impact values under the conditions of this test.

Fig. 7. This graph shows the possible impact values which may be obtained by using trucks of different capacities. It is clear that the light truck, W, if run at a sufficient speed, may give impact values as high as a heavy truck, when run at the ordinary truck speeds of 8 to 10 miles an hour. These impact values were all obtained from a 2-inch obstruction. This graph shows that it cannot be said that a heavy truck always gives the highest impact values, without stating several qualifying conditions, especially the condition of speed and of tire equipment. This statement refers to impacts only. It should be noted in particular that a light truck running at high speed will produce large impacts only occasionally and never very heavy load pressures; while a heavy truck will produce in addition to impacts a continuous heavy pressure on the road surface.

As might be expected, the pneumatic tire is given the front rank. Its maximum impact value is about 1¼ times the static load at one rear wheel, with an average value of not more than 25 per cent. For a solid tire passing over a 1-inch obstruction at 16 miles an hour the impact value may be as high as seven times the load at one rear wheel and the average value about 4 times the static load. Truck speed has an important influence on the degree of impact force, the impact increasing with the speed in the following approximate ratio: Solid tires, 10 to 100 per cent; cushion tires, 10 to 75 per cent; and pneumatic tires, 0 to 10 per cent.

A SIMPLE BUFFING CONE

How the finishing touches are put to a tire made by the unit molded system is shown in the accompanying illustration, and simple as the process is, it is very effective.

TIRE FINISHING DRUM

The essential apparatus is a truncated cone, shaped not unlike an exaggerated butter-tub, mounted on a short, projecting shaft. On this tapering form the workman places a casing of any size, and while it is being revolved quickly and neatly, removes with a rasp, the overflow left on the casing at the center of the tread by the twin tire mold.

Meeting of the Rubber Division of the American Chemical Society

THE sixty-first meeting of the American Chemical Society was held in Rochester, N. Y., April 25 to 29. Two days were devoted to sessions for consideration of the programs of the various divisions. Those of the Rubber Division drew an average attendance of about sixty rubber chemists. Much interest was shown in the papers, discussions and in the exhibition, under the microscope, of rubber compounded with various ingredients.

The following is a brief record of the proceedings, with abstracts of the papers presented:

METHODS FOR THE ANALYSIS OF VULCANIZED RUBBER

The methods of analysis recommended by the Joint Rubber Insulations Committee were discussed in detail, and various changes of procedure suggested. Elaboration and test of these methods was referred to a committee, as follows: W. W. Evans, The B. F. Goodrich Co., chairman; F. J. Dugan, The Goodyear Tire & Rubber Co.; S. Collier, Bureau of Standards; A. H. Smith, Thermoid Rubber Co.; W. B. Wiegand, Ames Holden McCready Limited; Professor H. S. Simmons, Municipal University of Akron.

THE DIRECT DETERMINATION OF THE SULPHUR OF VULCANIZATION[1]

By S. Collier and Michael Levin

The sulphur actually combined with the rubber is determined by dissolving the rubber and polyprene sulphide in cymene. The solution is diluted with petroleum ether and filtered after the fillers have settled out. The filtrate containing the polyprene sulphide is evaporated to dryness by heating on the steam bath and by means of a gentle current of air. The residue is dissolved in nitric acid and the solution evaporated to dryness. Three cc. of nitric acid are added to the residue and then five gm. of sodium carbonate. The mixture is fused and the amount of sulphur determined.

THE ANALYSIS OF RUBBER GOODS CONTAINING ANTIMONY PIGMENTS[1]

By S. Collier and Michael Levin

The amounts of rubber and antimony are determined on the same sample. A sample previously extracted with acetone is dissolved by heating in cymene. The solution is diluted with petroleum ether and filtered through a Gooch crucible after the fillers have settled out. The antimony sulphide is dissolved out with hydrochloric acid, precipitated with hydrogen sulphide, and determined volumetrically by titration with standardized potassium permanganate. A correction for insoluble organic matter is made by drying, weighing and igniting the crucible. The sulphur fillers are determined on a separate sample, which has been filtered from the cymene-petroleum ether solution and washed with solvent.

THE SOLUBILITY OF GASES IN RUBBER AS AFFECTING THEIR PERMEABILITY[2]

By Charles S. Venable and Tyler Fuwa

An experimental study was made of the various factors influencing the solubility of a gas in rubber. It was found that when rubber absorbs the gas, this gas is held in true solution and not by absorption. In the case of carbon dioxide, which has about an average solubility, the amount of gas thus held in true solution by the rubber is directly proportional to the pressure, and decreases with increasing temperature. This solubility is unaffected by degree of vulcanization or by the presence of compounding ingredients. Evidence was presented to show that the other gases behave in a similar manner.

Relative solubility values obtained for various gases in rubber show that there is a general relationship between the solubility and density of the gas and its rate of penetration through rubber. These results, in general, confirm the original hypothesis of Graham that the penetration mechanism consists in the solution of the gas at one surface of the rubber and the diffusion of the undissolved gas through the rubber and its evaporation at the other surface. The indications are, however, that the actual size of the gas molecule is also an appreciable factor. A striking relationship between the solubility of various gases in rubber and in water has been noted.

THE INFLUENCE OF PIPERIDINE-PIPERIDYL-DITHIOCARBAMATE ON VULCANIZATION[2]

By G. Stafford Whitby and O. J. Walker

Tested in a 90:10 rubber-sulphur mix, one per cent of the base mentioned is found to reduce the time of cure by seven-eighths, and even at 130 degrees C., to lead to curing in about one-third of the time required at 141 degrees C. in its absence. At the optimum cure, rubber containing the base showed (a) a noticeably lower sulphur coefficient, (b) a very considerably higher breaking stress, (c) a noticeably smaller elongation, and (d) a lower position of the stress-strain curve (strains as ordinates) than did rubber from which the base was absent. On aging for seven months, vulcanizates prepared with the base behaved in a manner essentially similar to that shown by vulcanizates prepared without it; the stress-strain curves coming down the paper to a similar extent and the breaking points altering in a similar way.

CONTRIBUTION TO THE KNOWLEDGE OF THE RESINS OF HEVEA RUBBER[2]

By G. Stafford Whitby and J. Dold

A number of crystalline substances, as follows, have been isolated from the acetone extract of plantation Hevea rubber. At least two of these are sterols. The less soluble of the two constitutes roughly 5 per cent of the extract. It decomposes without melting, and forms an optically active acetate crystallizing in leaflets and melting at 169 degrees C. With this sterol, another substance, not yet isolated in a state of purity, was associated. The more soluble of the two sterols consisted of matted, flexible leaflets, melting at 127 degrees C., and showing $(\alpha)_d$ — 25 degrees C.[3] In addition, a substance, optically inactive, melting at 62 degrees C., and also constituting roughly 5 per cent of the extract, was obtained. Quebrachitol was isolated from the extract, and was found to occur generally in sheet and crêpe. Further: the results of a quantitative study of the oxidation of caoutchouc under the catalytic influence of copper are reported.

RELATIVE THERMAL CONDUCTIVITIES OF SOME RUBBER COMPOUNDS[2]

By A. A. Somerville

A series of thin sheets of rubber with thermocouple junctions between were placed on a steam chest kept at 100 degrees C. On top of this pile a vessel containing melting ice maintained a temperature of 0 degrees C. By comparing the time necessary for the center thermocouple to reach maximum temperature for various stocks a measure of their relative heat conductivity was obtained. The conductivities of stocks containing 3 and 10 per cent sulphur on the rubber and 10 per cent sulphur with 2 per cent accelerator were found the same. This value was taken as

[1] Published by permission of the Director of the Bureau of Standards, Washington, D. C.

[2] Abstract of paper delivered before the Rubber Section of the American Chemical Society in Rochester, N. Y., April 27, 1921.

[3] Meaning that the angle of rotation of the plane of polarized light was 25 degrees counter-clockwise.

unity. The following table contains the values obtained with 10 per cent sulphur, 2 per cent accelerator and 150 per cent zinc oxide or its equivalent volume of other filler based on 100 parts of rubber:

Base stock	1.00
Zinc oxide (150 per cent)	1.65
Glue	.87
Asbestine	.91
Lampblack	1.02
Gas black	1.14
Crimson antimony	1.15
Whiting	1.23
Lithopone	1.33
Magnesium carbonate	1.45
Soapstone	1.45
Clay	1.67
Litharge	1.78
Red oxide	1.86
Fossil flour	1.90
Barytes (ground)	2.28
Barytes (precipitated barium dust)	2.65
Frictioned fabric	1.07

The state of cure of the various stocks was found to have no effect on the conductivity.

REACTIONS OF ACCELERATORS DURING VULCANIZATION—III CARBO-SULPHYDRYL ACCELERATORS AND THE ACTION OF ZINC OXIDE[2]

By C. W. Bedford and L. B. Sebrell

Reactions of accelerators producing mercapto groups by action of sulphur are discussed. Thiocarbanilide with aniline in benzol solution will dissolve zinc oxide and will vulcanize a zinc oxide cement at room temperature. Other zinc salts of mercaptans, such as zinc thiophenol and zinc-ethyl-xanthate, will vulcanize pure gum cements containing sulphur at room temperature. These accelerators are free from nitrogen or alkali and also function in press or steam cures. Without zinc oxide no accelerator has been found which will vulcanize at room temperature. Zinc salts of carbo-sulphydryl accelerators furnish the key to the paper.

RAPID BOMB METHOD FOR DETERMINING SULPHUR IN RUBBER COMPOUNDS

By W. W. Evans and Ruth Merling

A new method for determining sulphur in rubber compounds. The sample consists of 0.2-gm. of rubber suitably packed in sodium peroxide with a little sugar and potassium chlorate on top. Ignition is secured in a Parr calorimeter. The total time for running a determination was placed at three hours. Results follow:

Sulphur Incorporated	Nitric Acid-Bromine Method	Bomb Method
....	2.23	2.39
....	2.75	2.98
3.50	3.55	3.73
6.35	6.41	6.36

The method works with high amounts of sulphur, as in an antimony tube or hard rubber analysis. A blank should be run, as chemically pure sodium peroxide sometimes contains sodium sulphate.

VOLUME INCREASE OF COMPOUNDED RUBBER UNDER STRAIN

By Henry Green

At the Philadelphia meeting a year and a half ago, H. F. Schippel pointed out that compounded rubber increases in volume when strained. He demonstrated this fact by indirect methods. The present author has been able to observe and photograph, by means of the microscope, the actual changes which take place. Working with rather coarse barytes, he obtained cavities at either end of the barytes crystals. He noted that some particles developed cavities when the piece containing them was stretched, but some did not. In seeking an explanation of this, he advanced the theory that many of the particles were surrounded with an adsorbed film of air. In such cases the rubber did not adhere to the crystal. In other cases, when this film was absent, there was adhesion between the rubber and crystals and no cavities were obtained. Referring to zinc oxide, Mr. Green stated that in a stock containing 100 volumes of zinc oxide to 100 volumes of rubber, no agglomerates were discernible under the microscope.

ROUND TABLE DISCUSSION

FACTORY CONTROL OF VULCANIZATION

A simple form of apparatus for comparison of thermometers used on vulcanizers and curing presses was described by Arnold H. Smith. It consists of a wrought-iron pipe three or four inches in diameter and about three feet long with capped ends, arranged for steam inlet and drainage. A number of openings are provided on the top and one side of the pipe for receiving the thermometers to be compared with the correct or standard instrument reserved for reference. This device is practically the same as one illustrated and described in THE INDIA RUBBER WORLD, June 1, 1904.

In the discussion it was noted that to render the tests reliable a pet-cock should be provided at each thermometer connection to insure venting trapped air and provide circulation of steam around the thermometer bulb.

TESTING CRUDE RUBBER AS RECEIVED AT THE FACTORY

Sampling a lot of crude rubber for test is either a matter of selecting from each bale and averaging, or selecting portions from the broken down averaged lot and averaging again for test purposes.

The view was advanced that test of the curing quality of crude rubber should be: (1) by compounding with zinc oxide, sulphur and an organic accelerator, or, (2) by compounding with litharge and sulphur. Dr. G. S. Whitby suggested that stress-strain curves will be found very illuminating in connection with judging the curing value of crude rubbers.

REACTIONS BETWEEN SULPHUR AND VARIOUS SOFTENERS

This topic did not elicit much comment, except that the function of softeners in compounding was principally to augment plastic flow in the mixing. Dr. Bingham, of Lehigh University, Easton, Pennsylvania, and Henry Green of The New Jersey Zinc Co., have published researches on the subject of plastic flow.

PHYSICAL TESTING COMMITTEE

A new physical testing committee was appointed as follows: C. Olin North, chairman; W. J. Wiegand, S. Collier, E. H. Grafton, and H. E. Simmons. This committee was instructed to consider the standardization of methods of plotting stress-strain curves and other data, standardization of experimental mixings, and testing of various rubbers and other materials. An investigation of new methods of physical testing was advocated for better judging degrees of vulcanization for the probable life of rubber compounds.

SHOE BILL PROHIBITS LEATHER SUBSTITUTES UNLESS LABELED

The Caulfield bill recently referred to the Committee on General Laws of the State of New York amends the general business law regulating the sale of boots and shoes, and adds the following new sections, to take effect September 1, 1922:

> UNLAWFUL SALE: No person, association or corporation, within this state, shall sell, offer or expose for sale any boot or shoe with a counter, sole, insole, middle sole or slip sole made in whole or in part of leatherboard, strawboard, leatheroid, fibreboard, horn fibre, pate or any other substitute for leather whatsoever, without printing upon a tag securely affixed to each boot or shoe, in plain sight and in the English language, stating what substitute for leather, if any, has been used, designating each part of such boot or shoe where such substitute has been used. And if no substitute for leather has been used, the tag shall bear a statement to that effect. The removal of such tag upon a sale, exposure or offer of sale of any boots or shoes by any person other than by the purchaser shall be deemed a violation of this article.
>
> EXCEPTIONS: This article shall not be construed to apply to the use of a rubber heel on any boot or shoe, or eyelets, or straps used to assist in pulling on the boot or shoe.

What the Rubber Chemists Are Doing

SPONTANEOUS COAGULATION[1]

SPONTANEOUS coagulation in the air gives a slimy ,yellow to brown surface layer, which, during crêping, causes a loss in rubber and makes the crêpe streaky and somewhat discolored. The coagulation is sometimes incomplete and the serum milky. Coagulation with sugar, and spontaneous coagulation in the absence of air have been proved by many investigators.

1. Comparative experiments in which the portions of undiluted latex were weighed and the rubber collected showed close average percentages of air-dried crêpe when coagulated by various means, that is: by acetic acid; spontaneously in air; the same in absence of air; and by sugar in air.

These rubbers showed tensile strength and slope practically the same. The spontaneously coagulated rubber cures somewhat faster and shows a somewhat higher viscosity. The samples coagulated in the air had two days to mature as against one day for the others, cured much faster and showed a higher viscosity and somewhat smaller slope.

2. Spontaneous coagulation proceeds well in latex from trees that have had a period of rest and therefore give a latex of high rubber content, and a slow-curing rubber. The properties of the rubber lie in the above-mentioned direction, but the rate of cure, when crêping after 24 hours, increases much more than in normal latex, so that the abnormally slow rate of cure of ordinary crêpe disappears to some extent.

3. From a series of experiments on heavily tapped trees under varying conditions it is clear that heavy tapping causes the substances (sugars?) that are responsible for the progress of spontaneous coagulation to decrease, so that coagulation is less easy and complete. The substances, however, that have an influence on rate of cure (natural accelerators in the latex, decomposition products formed by maturation) are not so affected by heavy tapping that this can be detected in the properties of the spontaneously coagulated rubber, which are the same for light or heavy tapping.

4. Experiments on an estate with spontaneous coagulation in the absence of air showed that coagulation proceeds well in undiluted and 15 per cent latex, but the crêpe was somewhat dull and the color not so light as the market demands.

[1]By De Vries and Spoon. Archief voor de Rubbercultuur, July, 1920. Communication of the Central Rubber Station.

ON THE DRYNESS OF PLANTATION RUBBER[1]

There are irregularities in raw rubber which make their appearance in the masticating and mixing operations of the rubber manufacturer. It is obvious that a soft resinous rubber such as an African grade will break down easily in the mill and requires but little power to reduce it to a suitable consistency for the incorporation of the mineral ingredients. A tougher and higher grade of rubber will naturally require more power for this purpose. Plantation rubber, as a class, takes more power than wild rubber, even the best wild rubber such as fine hard Pará. Manufacturers complain of irregularity in plantation rubber in this respect, and assert that some of it is excessively "dry," that is, it cannot be made sufficiently plastic to take up the minerals except as a result of a very prolonged treatment. The resulting compound is also affected, being unusually hard and tough.

Thus far the author has not succeeded in devising a really satisfactory test by which the dryness of rubber can be measured. An interesting series of experiments was carried out on five specimens of plantation crêpe variously prepared and including one of unknown origin which was found to be particularly difficult to break down on full-sized mills in the factory. Each sample was masticated to the same state of plasticity. After three months, solutions were prepared in xylol and the viscosity of a 0.25 per cent solution determined and compared with the viscosity of the rubber before mastication.

From the results obtained it appears that a rough grading of raw rubbers as to plasticity may be obtained by an experienced operator by masticating small quantities on an experimental mill, also that the viscosity of the raw rubber is an indication of plasticity, but it must not be assumed that in all cases high viscosity is necessarily accompanied by low plasticity. In the past there has been a tendency to associate high viscosity with "nerve" or high quality, but it has been found that the relationship between viscosity and the properties after vulcanization is more complicated and less concordant than was at first supposed.

It is, however, asserted that viscosity tests, if combined with vulcanization tests, give valuable indications as to the quality or "nerve" of the rubber. From the foregoing experiments it would appear, however, that high viscosity is not of itself a desirable property, as it appears to be accompanied by low plasticity and the most desirable type of rubber from the manufacturer's point of view would appear, therefore, to be one giving a low viscosity but high figures after vulcanization.

We are ignorant of the cause of "dryness" in plantation rubber. The acetone extract, resin content, does not vary sufficiently to explain the difference between the samples. It is possible that the nature and proportion of the coagulant may have an influence. Certain batches of sulphuric-acid-coagulated rubber were found to work "dry," and were difficult to break down, but we failed to show that sulphuric-acid-coagulated rubber always works dry. In any case, for other reasons sulphuric acid should not be used for coagulation. Another possible cause of dryness is insufficient washing on the mill. Crêpe which is lightly rolled and full of holes is said to be difficult to break down. Occasionally rubber is not used for a year or more after arrival. Such rubber freezes in the winter. When thawed it is still harder and tougher than before, and requires more power to break down than if it had been used fresh. Freezing and careful thawing of rubber considerably increases the tensile strength in the unvulcanized condition, and, therefore, probably affects the plasticity.

[1]By Henry P. Stevens, Bulletin of the Rubber Growers' Association, January, 1921, page 43.

THE CAOUTCHOUC MOLECULE[1]

Harries in his work on caoutchouc[2] regards the caoutchouc molecule as a polymerized assemblage of units consisting of the basal hydrocarbon C_5H_8, of such a nature that depolymerization may occur with great ease. Presumably, as when his earlier formula was enunciated, he considers the polymerization as due to auxiliary valences of the nature of Thiele's partial valences.

In one respect Harries' newer formulation of the caoutchouc molecule approaches Pickles' formulation. The 20-carbon ring which he adopts is identical with the ring proposed by Pickles, if the number of isoprene units included in the latter is limited to five. Pickles, however, regarded the ring as including at least eight such units. The essential difference between the two views remains. The former regards the caoutchouc molecule as consisting of a number of 20-carbon rings polymerized; the latter as consisting of a single larger ring.

The chief considerations which Harries urges against the view that the molecule consists of a single large ring are: (1) the readiness with which caoutchouc depolymerizes; (2) the oc-

[1]Dr. G. Stafford Whitby. The India-Rubber Journal, February 12, 1921, page 313.

[2]Untersuchungen Ueber die Natürlichen und Künstlichen Kautschukarten, Berlin, J. Springer, 1919, 258 pp.

currence of several forms of caoutchouc, representing, he supposes, different degrees of polymerization; (3) the behavior of caoutchouc in some respects as a saturated hydrocarbon, namely, its failure to become reduced by hydrogen in the presence of platinum black or palladium.

POLYMERIZATION

Mention may be made of a recent very interesting paper on the general subject of polymerization in which Professor Staudinger[3] strongly urges the view that polymerization processes should and can be regarded as involving only normal valences, and that auxiliary or partial valences should not be called in to explain polymerization. In accord with this view, he favors the closed-chain formula for caoutchouc proposed by Pickles. He also interprets on the basis of a similar closed-chain formula the results of Steimmig who obtained as scission products of samples of caoutchouc prepared by the polymerization of isoprene with sodium, not only laevulinic acid, but also acetonylacetone and succinic acid.

VULCANIZATION

Among Harries' most recent work on rubber are some observations on the nature of the vulcanization process. Harries distinguishes between primary vulcanization and aftervulcanization. In primary vulcanization sulphur becomes adsorbed, but not chemically combined. The essential change is in the condition of the caoutchouc from a metastabile form, soluble in organic solvents, to a stabile form insoluble in such solvents. The stabile caoutchouc, as obtained after the exhaustive extraction of sulphur from the primary vulcanized material, he found to be unvulcanizable. No chemical difference between the two forms could be ascertained by an examination of the ozonides.

In addition to an account of his work on natural caoutchouc, Harries' recently published volume gives an interesting review of his work on synthetic caoutchouc derived, by a variety of polymerization methods, from butadiene, isoprene, piperylene and dimethylbutadiene.

[3]Berichte, 1920, page 1073.

VARIATION IN FINE HARD PARAS AND PLANTATION RUBBER[1]

From the earliest plantation days fine hard Pará rubber has served as a standard by which plantation rubber has been judged. It is now generally agreed that much first latex plantation rubber is on an average quite equal to fine hard Pará but shows greater variation in rate of cure. It is generally assumed that the latter shows no appreciable variation in this respect and various theories have been put forward to explain the difference between it and plantation grades. But few comparative tests between different samples of these rubbers, have been made. It seems, therefore, that adequate experimental proof of the superior uniformity of fine hard Pará in rate of cure does not exist.

The results of his own work and that of others is summarized by Stevens in the following table, remarking that the variations calculated on the basis of the average deviation from the average allows an approximate comparison in spite of the difference in the number of samples.

	Average deviation from the average; per cent of time of cure
Eaton and his collaborators on 26 samples (probably each a mixture from different balls of fine hard Pará)	6.1
Stevens on 5 samples from different balls of fine hard Pará	9.5
Stevens on 23 samples of crêpe prepared for testing on different occasions under uniform conditions	4.8
De Vries and Spoon on—	
193 samples of smoked sheet	10.5
131 samples of first latex crêpe	5.1

Assuming that the conclusions arrived at are correct, namely, that fine hard Pará rubber shows much the same variation in rate of cure as probably smoked sheet, we are faced with the difficulty of explaining the manufacturer's preference for fine hard Pará and his complaints as to the variability of plantation rubber. It should be noted that plantation rubber is not all first latex and quite a considerable proportion originates from native holdings. This fact is sufficient explanation of the variation in plantation rubber apart from other contributory causes.

[1]By Dr. H. P. Stevens. Bulletin of the Rubber Growers' Association, September, 1920, page 347.

EFFECT OF ACIDS IN RETARDING THE RATE OF CURE[1]

In general as regards rate of cure, the effect of treatment with hydrochloric acid is intermediate between that of sulphuric acid and that of acetic acid. Hydrochloric acid, like sulphuric acid, reduces the rate of cure, although to a lesser extent, and the rate of cure is restored more completely by soaking in water than in the case of sulphuric acid. The amount of hydrochloric acid retained by the rubber is very small and similar in quantity to the amount of acetic acid retained under similar circumstances, and much smaller than the amount of sulphuric acid retained. This is in accordance with the volatility of hydrochloric acid, and a large part appears to be lost by evaporation when the crêpe rubber is hung to air dry. The relative action of acetic, hydrochloric and sulphuric acids on rate of cure therefore is not proportional to the amounts of these acids retained by the rubber. Hydrochloric acid has probably a greater retarding effect than sulphuric acid, having regard to the very small amount retained.

From this point of view, hydrochloric acid is very unsuitable for latex coagulation. It is also unsuitable because rubber so coagulated frequently becomes soft and tacky on keeping. This does not happen with sulphuric acid, and it is evident that hydrochloric acid has a degrading or oxidizing effect on raw rubber, and it should never be used for coagulating latex under any circumstances.

[1]By Henry P. Stevens. Bulletin of the Rubber Growers' Association, November, 1920, page 435.

SYNTHETIC RUBBER

In the *Allgemeine Automobil-Zeitung* Dr. Albert Neuburger sketches the historical development of synthetic rubber in Germany, referring to its usefulness during the war, and advances the opinion that under economic conditions which prevail in Germany, synthetic rubber may be perfected to actually compete seriously with the natural product. It is planned to develop the German coal industry intensively, and by distilling the coal at the mines, conserve all its by-products. These supplies of acetone and benzol will give the necessary source materials.

The important consideration is the possibility of developing synthetic rubber with essentially the same technical characteristics as the natural product. Germany, since the war, naturally retains greater interest in the future prospects of synthetic rubber than any other country. Dr. Neuburger, in fact, suggests that it is possible that Germany in time may not need to import natural rubber.

CHEMICAL PATENTS

THE UNITED STATES

PROCESS OF TREATING VULCANIZED RUBBER, CONSISTING OF REducing it to a finely divided state under conditions of exclusion of oxygen, adding a small quantity of new, unvulcanized rubber in solution, sufficient merely to film the particles of old rubber, expelling the solvent, and forming and vulcanizing in the usual manner.—Joseph Porzel, Buffalo, New York, assignor, by mesne assignments, to Superior Rubber Co., Pittsburgh, Pennsylvania. United States patent No. 1,374,231.

ADHESIVE CEMENT AND PROCESS OF MANUFACTURE. A CEMENT consisting of rubber, and water as solvent for the dextrin.—Thomas Edwards, Milton, Massachusetts. United States patent No. 1,374,992.

VULCANIZED OIL PRODUCT PROCESS. DEPOLYMERIZING A VULcanized oil product in the presence of gaseous hydrochloric acid.—

Walter O. Snelling, Allentown, Pennsylvania. United States patents No. 1,376,172 and No. 1,376,173.

VULCANIZED OIL PRODUCT. A LIQUID VULCANIZED OIL PRODUCT capable of being transformed into a solid factice-like material on contact with water.—Walter O. Snelling, Allentown, Pennsylvania. United States patent No. 1,376,174.

THE UNITED KINGDOM

ACCELERATORS FOR VULCANIZING RUBBER. FURFURAMIDE AND other nitrogen derivatives of furfuryl are used as accelerators. Several furfuryl derivatives are mentioned, in particular the condensation products of pyromucic aldehyde with ammonia or animes.—British patent No. 157,050. (Not yet accepted.)

INSULATING COMPOSITIONS. CELLULOSE DERIVATIVES, PARTICULARLY esters, such as nitro-cellulose, acetyl cellulose, and viscose, and ethers are mixed with non-hygroscopic, liquid or plastic insulating substances such as waxes, oils, fats, resins, gutta percha, etc., with or without bitumen and filling ingredients. Castor oil, either treated with hydrogen or not, is stated to be a suitable insulating ingredient.—Siemens-Schuckertwerke, Siemensstadt, near Berlin, Germany. British patent No. 157,120. (Not yet accepted.)

INDIA RUBBER COMPOSITION FOR SOLES AND HEELS, PACKING FOR steam and water joints consists of rubber 50 parts; sulphur 10 parts; disintegrated waste fabrics coated with non-vulcanized rubber 39 parts; and an accelerator such as para-nitroso-dimethylaniline one part. This mixture is calendered and vulcanized under pressure for one hour at 149 degrees C.—India-Rubber, Gutta Percha & Telegraph Works Co., Limited, 31 rue de la Boetie, Paris. British patent No. 157,821. (Not yet accepted.)

RUBBER SUBSTITUTES MADE BY HEATING SULPHUR AND ANY ANImal or vegetable fixed oil, in a closed vessel until the reaction is completed. The mixture is also agitated, and zinc oxide, litharge, magnesia, or other catalyst or accelerator is employed.—Western Rubber Co., Washington, assignee of H. H. Hazeltine and M. Gregory, Tacoma, Washington, U. S. A. British patent No. 157,836. (Not yet accepted.)

COAGULATING LATEX. LATEX IS SPRAYED IN A CURRENT OF A drying medium which may be heated to 200 degrees F., to obtain a product containing all the solid constituents of the latex. Premature coagulation is prevented by the addition of ammonia or the like. Vulcanizing agents as sulphur, nitro-compounds, sulphur compounds, and fillers, namely, carbon black, zinc oxide, etc., may be added to the latex or may be introduced into the spraying chamber with the latex. When additions are made to the latex, the preservative added is preferably saponin, glycerine or glue in the proportion of about 0.1 per cent. The mixing thus obtained is more homogeneous, does not require drying, mastication is rendered unnecessary, and after vulcanization by the usual methods, a product of greater tensile strength is obtained.—E. Hopkinson, 1790 Broadway, New York, U. S. A. British patent No. 157,975. (Not yet accepted.)

COATING FOR BALLOON FABRICS CONSISTING OF TURKISH BIRDlime dried at 180 degrees F. and coated with shellac, varnish or rubber solution. Mercuric chloride is added to the birdlime as a preservative.—C. A. Cleghorn, Brackenside, Woburn Sands, Bedfordshire. British patent No. 158,366.

DEVULCANIZING. FINELY DIVIDED RUBBER IS IMPREGNATED WITH cold solution of alkali, and heated in a closed vessel to about 338 degrees F. The product may be further treated with hydrochloric acid and washed.—J. Smith, 12 Terregles Avenue, Pollokshields, Glasgow., British patent No. 158,783.

NON-INFLAMMABLE COMPOSITION OF RUBBER, HYDRATED OXIDE of aluminum, litharge, and sulphur, with or without asbestos (see patent No. 125,622), is used by itself in sheets, blocks, tubes, etc.—W. H. Perkin, Oxford University, and J. H. Mandleberg and Mandleberg & Co., Limited, Albion Waterproofing Works, Pendleton, Manchester. British patent No. 159,014.

OTHER CHEMICAL PATENTS

GERMANY

PATENTS ISSUED WITH DATES OF ISSUE

NO. 326,541 (October 10, 1918.) Vulcanization of rubber on metals. A layer of adhesive, viscous material, which is not absorbed by rubber, is interposed between the rubber and the metal. The intermediate and by-products obtained in the manufacture of synthetic rubber are suitable for the purpose. Felten and Guilleaume, Carlswerk, A.-G.

326,819 (February 20, 1917.) Vulcanized rubber products of great strength and extensibility are obtained by using antimony pentoxide in the mixture: the result is a red product of greater softness, elasticity and toughness than those obtained with golden antimony. Farbenfabriken formerly Friedrich Bayer & Co., Leverkusen, near Cologne-on-the-Rhine.

336,146 (July 25, 1919.) Method of separating rubber from crude or vulcanized waste rubber. Peter Friesanhahn, Hubertusallee 41, Berlin-Grünewald.

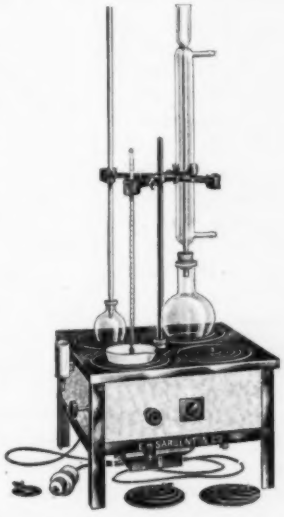
336,476 (February 15, 1918.) Plastic masses. Farbenfabriken formerly Friedrich Bayer & Co., Leverkusen, near Cologne-on-the Rhine.

LABORATORY APPARATUS

CONSTANT TEMPERATURE WATER BATH

THE demand for a water bath electrically heated and provided with a constant temperature control that is sufficiently sensitive for the general laboratory has led to the design and manufacture of the apparatus illustrated.

The range of constancy in the temperature of this water bath is one degree C., which is sufficiently close for general analytical work. The regulator may be set to produce and maintain any temperature between a few degrees above room temperature and the boiling point of water. Dishes of any form may be used with this apparatus. A support is provided to hold condensers, thermometers, etc. The area of the bath is 13 by 13 inches and the top is provided with four holes, each five inches in diameter and provided with concentric rings. It is made for 110-volt and 220-volt currents and may be used on either alternating or direct current. It is equipped with an attachment for maintaining a constant water level in the bath and with cord and plug for attaching to the electric line.—E. H. Sargent & Co., Chicago, Illinois.



SARGENT'S ELECTRIC WATER BATH

LABORATORY GASOLINE TORCH

"DREADNAUGHT" TORCH

A gasoline torch is frequently useful in the rubber laboratory for many purposes. The illustration shows a new and greatly improved torch of this sort known as the "Dreadnaught." Among the features claimed, which give it pre-eminence, are these—it gives the hottest fire, withstands the hardest knocks, is quick-starting, durable and non-leaking.—P. Wall Manufacturing Supply Co., Pittsburgh, Pennsylvania.

RUBBER MICRO-FUNGUS

The purer and more elastic grades of vulcanized rubbers when exposed to moist air are liable to develop growths of micro-fungus which to the naked eye often resemble dust. The fungus threads penetrate the surface rubber and may cause disintegration. Rubber thus injured wrinkles curiously and may become very weak.—J. Scott, *The India Rubber Journal*, London, 1920, 60, 410-412.

NEW TRADE PUBLICATIONS

THE RUBBER ASSOCIATION OF AMERICA, INC., NEW YORK, N. Y., has issued its Twenty-First Year Book, 1921, prepared by the general manager and secretary. The pamphlet is smaller this year, containing more practical information for the use of members. Information concerning the constituency of the general membership, of the various divisions and committees, and miscellaneous matter as charter, constitution and by-laws, necrology record, officers and directors since the Association was organized, may be found in the year book.

THE FIRESTONE TIRE & RUBBER CO., AKRON, OHIO, HAS issued a brochure entitled "Simplified Methods of Repairing Giant Pneumatic Truck Tires," which deals with tire, valve, and tube repairs of all types, and in the last few pages displays all repair materials manufactured by Firestone, and a list of the Firestone branches in the United States.

THE TIRE DIVISION OF THE CONVERSE RUBBER SHOE CO., BOSTON, Mass., is distributing to the trade a novelty booklet describing the Converse tire and its construction. On the front cover a section of a tire is pictured, showing a small part of the tread, and the inner construction and bead. The back of the folder has a tab cut to fit over the front picture of the tire and into a slit along the section where the tread and inner construction are shown, thereby picturing a perfect section of a Converse tire.

"BOYS' BOOK OF INDIANS" IS A BOOKLET PUBLISHED BY THE B. F. Goodrich Rubber Co., Akron, Ohio, for its "boy friends." It contains much information on Indian customs and life, together with colored illustrations of well-known Indian characters. Indian signs and their meanings are illustrated and the tribal divisions shown over an outline map of the United States. The center page is devoted almost entirely to a picture of the three styles of bicycle tires made by the Goodrich company and a word to the boys regarding their satisfactory service on bicycles. The back cover contains some interesting facts about auto tires.

THE CRUDE RUBBER DEPARTMENT OF THE ROGERS-PYATT SHELLAC Co., New York, has issued its standard blotter showing fluctuations of standard grades of rubber for 1920. The blotter also shows prices from January, 1911, through April, 1921.

AN INTERESTING SERIES OF ILLUSTRATED AND DESCRIPTIVE BULLETINS on rubber machinery has been prepared by The Wellman-Seaver-Morgan Co., Cleveland, Ohio. The machines treated are fully illustrated and described and include the full line manufactured by the company, such as rimming press, mixing mill, molds and cores, calender, tire press, cracker and washer, hydraulic vulcanizer, also an instruction book for the tire press.

CHAT NO. 4 OF "THE BLACK ART OF RUBBER COMPOUNDING" is being distributed to the trade by Binney & Smith Co., 81 Fulton street, New York. It contains brief explanatory remarks on the colloidal state; Micronex black as a colloid, and the rubber stress-strain curve and its requisite characteristics, with notes on continuity of stress and energy of resilience.

BULLETIN R-1401 WITH SUPPLEMENTARY SHEET No. 2, ISSUED by the Yarnall-Waring Co., Chestnut Hill, Philadelphia, Pennsylvania, explains the recent development of the Yarway balanced control valve in both angle and globe patterns, together with several forms of operating mechanisms.

"THE DANGERS OF FAULTY BRAKES," A BOOKLET ISSUED BY THE Thermoid Rubber Co., Trenton, New Jersey, explains how scientific research is solving the problem of increased traffic, and brings to the attention of the reader the necessity of keeping the brakes safe by periodical inspection, claiming that a tremendous burden is being placed on brakes as a result of modern motoring conditions. In addition to half-tone and line-cut illustrations the pamphlet contains many tables which should be of great interest to drivers of pleasure cars or trucks.

"C-H IRON-CLAD SOLENOIDS," PUBLICATION 873, APRIL, 1921, A four-page leaflet of the Cutler-Hammer Manufacturing Co., Milwaukee and New York, contains drawings and tables of stroke and pull of solenoids. The descriptive matter covers electric solenoids for operating brakes, clutches, valves and similar devices where a straight-line motion is desired.

"HOPEWELL POINTS THE WAY TO BETTER INSULATION," IS THE title given Catalog No. 1 of the Hopewell Insulation & Manufacturing Co., Hopewell, Virginia. The Hopewell products are illustrated and described in a thorough manner, with a brief introduction in which is explained that "Paramold," a hard rubber compound of which the insulators are made, is of high dielectric and mechanical strength.

"THE SERIAL NUMBER," VOLUME 1, NUMBER 1, THE OFFICIAL organ of the National Tire Dealers' Association, Cleveland, Ohio, made its appearance dated May 7, 1921. It is a four-page paper, 8½ by 11 inches, devoted to news of interest to the retail tire trade, editorials and open letters. Whether the sheet will be published monthly or bi-weekly remains to be determined by a vote of the members.

"STRETCHING A RUBBER BAND ACROSS THE SEA." LEAFLET ADdressed to rubber manufacturers by the committee on organization of the Foreign Trade Financing Corporation, 66 Broadway, New York.

This is a brief exposition of the large-scale plans for developing American export business which the Foreign Trade Financing Corporation intends to put into effect as soon as the $100,000,000 of stock in the new international trading concern has been floated, and for which subscriptions have been promised by some of the largest banks in the country. This concern, with a potential credit-extending capacity of a billion dollars, was organized under the Edge Act of 1919 to render for international commerce much the same service as is given domestic trade by the Federal Reserve Board. Realizing that while war-spent foreigners urgently want our goods, but cannot pay for them until their own industries begin to get on their feet, the new corporation would aid them and at the same time benefit American labor and capital by shipping to our foreign friends the goods they need, allowing them to pay with long-term promissory notes backed by good securities.

Manufacturers of rubber products, facing the serious problems resulting from rapidly-shrinking export orders, are reminded that they have but two avenues of relief, one being to cultivate trade in the sections of the world which suffered least in the war, as South America and the Far East, and the other being to cooperate actively with other American manufacturing interests, through some such agency as proposed, for extensive financing of overseas trade.

THE ADVANTAGES OF WATER VULCANIZATION

By Arthur E. Friswell[1]

MY first introduction to rubber manufacturing was in a department devoted to the manufacture of rubber thread. There I learned how and why rubber sheet for thread was and still is vulcanized in water. The following is a non-technical description of the process.

The rubber is calendered into sheets by a specially designed calender, which produces and doubles two sheets into one simultaneously. The sheet is rolled on itself as it comes from the calender, talc being used to prevent adhesion. When the sheet is thoroughly cooled, it is wound on a drum, and between each ply of rubber there is wound under tension a web from a roll of finely woven cotton cloth, absolutely free from all unevenness of

[1]Rubber factory consultant.

weaving, skipped threads, knots, etc. This cloth is applied wringing wet and great care is exercised to lay it taut and smooth and free from wrinkles or folds in every direction. The length of the rubber sheet is 60 to 65 yards. The width is determined by the calender rolls and varies in different factories from 36 to 60 inches, or even wider.

After wrapping, the entire roll on the drum is cross-wrapped or spirally bandaged under tension by a woven strip of strong cotton webbing to insure positive solidity of the rubber mass and to prevent the formation of air pockets between the plies. The drum upon which this winding occurs is about three feet in diameter and the precaution is observed of not bringing the first end of the rubber sheet into contact with the metal of the drum, but the drum is first wound or padded for several turns with wet, woven cotton sheeting. The reason for this is to prevent overvulcanizing of any one part of the rubber sheet by metallic contact and to ensure uniformity of vulcanizing conditions throughout the entire thickness or mass. The drum is then placed vertically in a vertical vulcanizer, the drum resting on end on a false perforated metal bottom placed several inches above the true bottom of the vulcanizer. Water is then admitted to the vulcanizer to a height to completely submerge the drum but not to completely fill the vulcanizer. A foot or more of space is left at the top of the vulcanizer above the water level to provide for expansion and for a body of steam. The cover of the vulcanizer is bell shaped. Steam is admitted through the bottom of the vulcanizer until the temperature of the water is raised to 280 or 285 degrees F. and brisk circulation of steam is maintained by means of a freely opened pet-cock or valve at the top of the vulcanizer. This is of vital importance. The water must be kept agitated, otherwise vulcanization is never uniform, and soft, partially cured spots show under later test.

The time required to effect vulcanization varies from 65 to 85 minutes for a compound of—in this country—one ounce of sulphur to one pound of fine Pará, and in England, of two ounces of sulphur to one pound of fine Pará. There is a curious feature here presented, namely, that of climatic and atmospheric conditions as affecting vulcanization. Where the atmospheric humidity is normally heavy, as in Manchester, England, more sulphur is required to effect vulcanization than in Massachusetts, where the air is normally lighter and dryer; and also the time required to effect vulcanization varies with the seasonal changes from extreme sharp cold in winter to extreme humid heat in summer, and this is quite aside and distinct from any differences whatsoever in the strength or nerve of various lots of rubber.

When the sheet of vulcanized rubber is unwound from the drum, its color has changed from amber to dirty green and it is saturated with water. Contrary to the opinion usually held by laymen, rubber does absorb water, and in the form of freshly vulcanized sheet for thread as described, it contains from 18 to 20 per cent by weight. The sheet is next suspended on racks in a drying room which is metal-sheathed throughout, to radiate heat from steam pipes. The temperature of the room is from 100 to 110 degrees F. Within 24 hours the moisture is evaporated and the sheet assumes the gray color usually associated with pure vulcanized rubber which has not been subjected to any alkaline desulphurizing process. (Some thread is later desulphurized, some is not, but, as Kipling says, "That's another story.") Whether the original manufacturers of rubber thread—whoever they may have been—found by experience that necessity compelled them to employ water as a vulcanizing medium, or whether it just naturally occurred to them in the first instance, I cannot say, but it is a fact that no other way of vulcanizing rubber sheets has ever been found to equal it. Water is an ideal heat conductor, and sheet vulcanized as described possesses a degree of permanent elasticity, due no doubt in part to the practically spontaneous conducting throughout the mass of a uniform temperature and perhaps in part to a beneficent chemical action which sheet vulcanized in any other way never possesses. Sheet so vulcanized and thread cut from it have a quality of something so lastingly virile, so velvety, in brief, so rubber-like, that there is nothing to touch it where elasticity is the main objective.

Another fine feature of water vulcanization is that it overcomes the bothersome shrinking problem. As every rubber man knows, sheet rubber cured in open steam or suspended from racks and exposed to dry heat shrinks unevenly, thus altering the gage or thickness as delivered from the calender.

Manufacturers of elastic bands have found that the best results are obtained from calendered sheet by suspending the tubes made from the sheet from poles or racks submerged in water raised to vulcanizing temperature. Wherever it is possible to employ water vulcanization, it will be found to posses distinct advantages over nearly every other form of curing.

THE RELATIVE ACCELERATING ACTION OF DIFFERENT COMPOUNDS OF LEAD IN THE VULCANIZING OF RUBBER

By J. M. Grove

INTRODUCTION

THE more one studies the subject of organic accelerators the more puzzling it becomes. Much has been learned about their immediate effect, but much more remains to be learned. Hence the numerous papers on the subject, and if, finally, dicta may be laid down governing their immediate action in varying proportions, there will still remain the question of their action as affecting the ultimate life of vulcanized rubber.

It was while engaged in an extensive investigation of the immediate action of various organic accelerators upon the vulcanization of different compounds that the writer was asked to determine the relative accelerating action of the most widely used compounds of the known—the old lead group.

So far as he was able to learn by reference to many compounds laid before him for investigation, there appeared to be no rule governing their use, although their use has for many years proved beneficial where it is possible to use them at all. Of course, their employment is prohibited where colors other than gray or black must be obtained.

METHOD OF EXPERIMENTATION

The accelerating action of one per cent of litharge was taken as the basis of comparison. The formula used consisted by weight of: smoked sheet 80 per cent, sulphur 2½ per cent, zinc oxide 5 per cent, and varying percentages of barytes, and the given lead compound under investigation to make up 100 per cent by weight. As the percentage of the lead compound introduced into the above formula was increased, the percentage of barytes was proportionately decreased. Thus, the relative percentage of smoked sheet, sulphur and zinc remained unchanged in all of the trials. (See Table 1.)

TABLE 1

FORMULAS OF COMPOUNDS

Ingredients	1	2	3	4	5	6	7	8	9	10	11	12
Smoked sheet	80	80	80	80	80	80	80	80	80	80	80	80
Sulphur	2½	2½	2½	2½	2½	2½	2½	2½	2½	2½	2½	2½
Zinc oxide	5	5	5	5	5	5	5	5	5	5	5	5
Barytes	11½	5½	6½	7½	9½	8½	6½	11½	10½	9½	7½	5½
Litharge	1	..	..	..	..	..	..	..	..	..	..	..
Sublimed white lead	..	7	6	5	..	..	..	..	..	..	..	..
Basic lead carbonate.	..	..	..	..	3	4	6	..	..	..	..	..
Sublimed blue lead.	..	..	..	..	..	..	..	1	2	3	5	7
	100	100	100	100	100	100	100	100	100	100	100	100

The ingredients of the different compounds were very carefully weighed and mixed in the laboratory, under conditions exactly alike. After a period of 24 hours' rest a sample from each compound, ⅛-inch in thickness, was cured in a press

for one hour at 280 degrees F. These vulcanized samples were allowed to rest for 24 hours. Then test pieces ¼-inch in width were cut from each slab with a suitable die, each piece was marked with lines two inches apart and physical tests were made by use of a Scott testing machine, the rate of speed being 20 inches per minute.

The results recorded below for tensile strength, elongation and set at break represent the average results of three tests of each sample. In taking the permanent set, the original marks two inches apart were stretched to twelve inches and so held for ten minutes, then allowed to recover for ten minutes, when measurements were taken and the percentage increase in length recorded.

RESULTS

When cured and tested as described above, Compound No. 1 (see Table 1) gave the following results:

Tensile strength per sq. in.	1,915 pounds
Elongation, or stretch	750 per cent
Permanent set	9 per cent
Set at breaking load	13.5 per cent

The first lead compound compared with litharge in accelerating action was sublimed white lead. It was found to require seven per cent of this compound to obtain results at all comparable with those given by one per cent of litharge. Six and five per cent of sublimed white lead gave tensiles far below that of one per cent of litharge.

TABLE 2

RESULTS OBTAINED WITH SUBLIMED WHITE LEAD

	5%	6%	7%
Tensile strength per sq. in.....*lbs.*	907	1,552	2,195
Elongation, or stretch	700%	885%	800%
Permanent set	15%	7.5%	8%
Set at breaking load	16%	18%	15%

Basic lead carbonate was next compared with litharge in accelerating action and it was found to require 3 per cent of this compound to give results approximating those given by one per cent of litharge.

TABLE 3

RESULTS OBTAINED WITH BASIC LEAD CARBONATE

	3%	4%	6%
Tensile strength per sq. in.....*lbs.*	1,853	1,635	2,079
Elongation, or stretch	800%	800%	850%
Permanent set	8.5%	7.5%	4%
Set at breaking load	19%		

Finally, sublimed blue lead was compared with litharge in accelerating action. The nearest approach to the results obtained with one per cent of litharge, was obtained with three per cent of sublimed blue lead. Further addition of this lead compound indicated decided overvulcanization; while one and two per cent indicated that the samples tested were very much undercured.

TABLE 4

RESULTS OBTAINED WITH SUBLIMED BLUE LEAD

	1%	2%	3%	5%	7%
Tensile strength per sq. in.....*lbs.*	210	779	1,663	1,733	2,125
Elongation, or stretch	800%	800%	800%	800%	750%
Permanent set	25%	11.5%	6.5%	4.5%	3.5%
Set at breaking load	43.6%	17.8%	12.8%	13%	12.5%

The results thus indicated that basic lead carbonate and sublimed blue lead have approximately the same accelerating action in the vulcanization of rubber.

In the course of his investigations, the writer tried combinations of lead compounds with hexamethylene tetramine, with remarkable results. It was found that such combinations enable one to greatly reduce the percentage of hexamethylene tetramine used; and when the price was high, this was quite an item of cost.

To further test the relative accelerating action of basic lead carbonate and of sublimed blue lead, and also to determine whether the accelerating action of basic lead carbonate is entirely dependent upon the lead hydroxide present, three per cent each of basic lead carbonate, of sublimed blue lead; and of chemically pure normal lead carbonate were introduced separately into the following formula and the compounds thus obtained were then cured in a press for 40 minutes at 290 degrees F. and tested as described above.

FORMULA OF COMPOUND NO. 13

	Per Cent
Smoked sheet	65
Sulphur	2¼
Zinc oxide	2
Blanc fixe	5
Barytes	22½
Hexamethylene tetramine	¼
Basic lead carbonate or sublimed blue lead, or normal lead carbonate	3
	100

In this connection, it may be stated that tests were made with the formula as given above, using blanc fixe and barytes in place of barytes alone. The results were sufficiently interesting to warrant further work that is now in process, the results of which will be presented in the near future.

TABLE 5

RESULTS OBTAINED WITH BASIC LEAD CARBONATE, SUBLIMED BLUE LEAD AND NORMAL LEAD CARBONATE IN COMPOUND NO. 13

	3% Basic Lead Carbonate	3% Sublimed Blue Lead	3% Normal Lead Carbonate
Tensile strength per sq. in.....*lbs.*	1,487	1,475	1,481
Elongation, or stretch	700%	750%	750%
Permanent set	8%	8%	9%
Set at breaking load	18%	19%	20%

Three per cent of sublimed white lead and of chemically pure lead sulphate was introduced separately into the same formula.

TABLE 6

RESULTS OBTAINED WITH SUBLIMED WHITE LEAD AND CHEMICALLY PURE LEAD SULPHATE

Tensile strength per sq. in.....*lbs.*	872	906
Elongation, or stretch	750%	725%
Permanent set	10%	10%
Set at breaking load	20%	16.5%

SUMMARY

The conclusions to be drawn from this investigation are:

1. That, of the most commonly used lead compounds, litharge possesses the greatest accelerating action.
2. That the relative accelerating action of basic lead carbonate to that of litharge is in approximately the proportion of 3 to 1.
3. That the relative accelerating action of sublimed blue lead is approximately the same as that of basic lead carbonate.
4. That the relative accelerating action of sublimed white lead is much below that of the other compounds of lead.
5. That it may be questioned whether the accelerating action of basic lead carbonate is entirely dependent upon the lead hydroxide present.
6. That combinations of lead compounds with hexamethylene tetramine enable one to greatly reduce the percentage of the organic accelerator used.

THE ACTION OF CERTAIN ORGANIC ACCELERATORS IN THE VULCANIZATION OF RUBBER—II[1]

By C. D. Kratz, A. H. Flower and B. J. Shapiro[2]

ONE of the early patents[3] for the use of synthetic nitrogenous organic substances in the vulcanization of rubber refers to the dissociation constant of 1×10^{-5} as the dividing line between accelerating and non-accelerating bases. On the other hand, Peachey[4] has pointed out that certain other substances which are not basic, or but slightly so, are also exceedingly active as accelerators. The number of examples in this class, however, is relatively small.

[1]Presented before the Rubber Division of the American Chemical Society at Chicago, Illinois, September 6 to 10, 1920.
[2]The Falls Rubber Co., Cuyahoga Falls, Ohio.
[3]German patent No. 280,198, 1914.
[4]Journal of the Society of Chemical Industry, 36, 1917. 950.

In the course of the experimental work described in this paper we have made a comparison of the sulphur coefficients of a type mixture vulcanized with the assistance of a number of accelerators closely related to aniline and for which the dissociation constants are known. We have also employed the hydrochlorides of two of these substances, relatively weak and strong bases, in order to observe the effect of the acid portion during the vulcanization. The results obtained and the conclusions drawn led us to employ the sulphides of ammonia as accelerators and vulcanizing agents.

Briefly summarizing these results, it was found that with the substances tested there was apparently no direct relationship between their dissociation constants and their excess sulphur coefficients or physical properties after vulcanization. In a closely related series, such as aniline and its methyl derivatives, the substance with the largest dissociation constant was found to be the most active. However, the relative activities of the members of this series were not proportional to their dissociation constants. Generally speaking, the activity of all of the substances could be traced to the amino group, and depended to a large extent upon whether or not substitution had taken place in this group. In this respect, they should probably be regarded as substituted ammonias, rather than as the more complex derivatives of other substances.

One effect of the basicity of two of the substances, methylaniline and *p*-toluidine, was determined with the hydrochlorides of these two substances. Our results showed that with substances of this type, the first effect of the base is to neutralize the retarding action of the acid formed in the decomposition of the salt during vulcanization. We had previously suggested this in a foot-note in a former paper.[5] We also found that when the acid liberated in the decomposition of such a salt is neutralized by other substances in the mixture, the activity of the hydrochloride is very close to that of the free base. These results are of particular interest, as Van Heurn[6] has shown that, whereas ammonium carbonate is moderately active as an accelerator in a mixture of rubber and sulphur, ammonium chloride is inert. The former salt decomposes into ammonia and a weak acid, the latter into ammonia and a strong acid, according to the following reactions:

$$(NH_4)_2CO_3 \longrightarrow 2NH_3 + H_2O + CO_2$$
$$NH_4Cl \longrightarrow NH_3 + HCl$$

Our final experiments, wherein we found that in a closed system rubber is vulcanized by heating with ammonium polysulphide or ammonium hydrosulphide, were carried on in order to obtain a reaction mixture of undoubted basic character, which at the same time would include H_2S as one of the decomposition products. The function of H_2S in connection with the vulcanization of rubber has long been made a subject of controversy. In the present instance it may be regarded as a very weak acid.

Our results with ammonium polysulphide may be explained as due to the decomposition of this substance into ammonia, hydrogen sulphide, and sulphur, the latter substance being liberated in an active (nascent) form which readily combines with the rubber. The analogy between our results with ammonium polysulphide, and those obtained years ago by Gerard[7] with potassium tri- and pentasulphides, is taken up in greater detail in the experimental part of this paper. It is equally evident, however, that if this explanation is advanced in the case of ammonium polysulphide, vulcanization with ammonium hydrosulphide requires that this substance decompose not into ammonia and hydrogen sulphide only, but with the subsequent formation of a polysulphide which liberates sulphur in the active form.[8]

It has been shown by Bedford and Scott[9] that many of the more complex substances which accelerate the vulcanization of rubber react with sulphur, with the liberation of H_2S and the formation of thiourea derivatives. In view of our results with the ammonium sulphides, the action of such thiourea derivatives would depend upon their ability to enter into a subsequent reaction with the H_2S formed, or the sulphur present in the mixture, with the formation of a polysulphide. Further, although the formation of a polysulphide in this manner would, to a certain extent, be dependent upon the basicity of the substance originally added as the accelerator, it is obvious that the dissociation constant of the reaction product would be a better indication of its activity than the dissociation constant of the original substance.

In a previous paper[10] we have suggested that the activity of certain nitrogenous substances may be interpreted on the basis of a change in valency of the nitrogen, with the nitrogen functioning as a sulphur carrier. This suggestion was made to assist in correlating the nitrogen content with the activity of the substances employed, although, as pointed out in the above paper, results obtained by others already indicated that the sulphur is not necessarily attached to the nitrogen. While our present results show that vulcanization may be effected by polysulphide formation, they do not exclude the possibility of the active nitrogen group acting as a catalyst.

The experimental results are shown in the following table:

TABLE I

First latex pale crêpe 100
Sulphur 8.1
Accelerator ..... *x*
Vulcanized for 90 min. at 148° C.

Substance	Formula	*x* = 0.01 G.Mol.	Determined M. P. or B. P. of Accelerator[1]	Dissociation Constant K at 15° to 18° C.	Excess Sulphur Coefficient	Physical Properties: Tensile Strength Lbs. Per Sq. In. at Break	Physical Properties: Final Length at Break
Control		....	.....	.....	(2.581)	1,229	1,090
Aniline	$C_6H_5NH_2$	0.93	183.1	3.50×10^{-10}	2.400	2,005	910
Methylaniline	$C_6H_5NH.CH_3$	1.07	192.0	2.55×10^{-10}	0.612	1,665	1,050
Dimethylaniline	$C_6H_5N(CH_3)_2$	1.21	192.5	2.42×10^{-10}	0.250	1,938	1,060
p-Toluidine	$CH_3.C_6H_4.NH_2$	1.07	45.0	1.60×10^{-9}	2.987	2,476	920
m-Phenylenediamine	$NH_2.C_6H_4.NH_2(1:3)$	1.08	62.6	1.35×10^{-13}	2.986	1,933	830
p-Phenylenediamine	$NH_2.C_6H_4.NH_2(1:4)$	1.08	140.6	2.48×10^{-13} [2]	5.248	193	430
p-Benzidine	$NH_2.C_6H_4.C_6H_4NH_2$	1.84	126.2	7.40×10^{-13} [2]	3.056	1,464	810
Phenylhydrazine	$C_6H_5NH.NH_2$	1.08	240.0	1.60×10^{-9}	0.751	1,052	1,080
Hydrazobenzene[3]	$C_6H_5NH.NH.C_6H_5$	1.84	126.0	.....	0.777	2,165	1,140

[1]All m. p. are below, and b. p. above the temperature of vulcanization. [2]Figure applies to second "K." [3]Does not have basic properties.

CONCLUSIONS

1. The activity of synthetic nitrogenous organic substances as accelerators is not proportional to the dissociation constants of the original substances and, with the exception of members of a closely related series, no definite relationship exists between

[5]Chemical & Metallurgical Engineering, 20, 1919, 420.
[6]Communications of the Netherland Government for Advising the Rubber Trade and the Rubber Industry, Part 6, 202.

[7]R. Hoffer, "Treatise on Caoutchouc and Gutta-Percha" (trans. Brannt), H. C. Baird & Co., London, 1883.

[8]As an aqueous solution of NH_4HS was employed, the action of this substance may also be explained by its dissociation products. It would dissociate with NH_4^+ as the cation and HS^- the anion. As the HS^- ion itself is weakly acid, there would probably be many H^+ and HS^- ions and but few S^{--} ions in the aqueous solution. The H^+ and S^{--} ions in turn react to form H_2S. On the other hand, $(NH_4)_2S$ dissociates with NH_4^+, the cation, and S^{--}, the anion. The latter, in the presence of water, dissociates with the formation of OH^- and HS^- ions. Thus, NH_4HS dissociates with the formation of a greater number of H^+ ions than in the case of $(NH_4)_2S$, and consequently with a greater reformation of H_2S. This may account for the difference in the relative activities of the two substances. The same may be true in the absence of water, as most organic accelerators are apparently soluble in rubber, the high dielectric constant of which indicates that this substance itself may be a good dissociating medium.

[9]Journal of Industrial and Engineering Chemistry, 12, 1920, 31.

[10]Journal of Industrial and Engineering Chemistry, 12, 1920, 317.

the activities and the dissociation constants of the original substances.

2. Substances which decompose or dissociate into other substances of acid character, or react with other components of the mixture to form substances of acid character, do not accelerate unless a neutralizing base or salt is present.

3. Vulcanization is effected by heating rubber in a closed system with concentrated aqueous solution of ammonium sulphides.

THE EDITOR'S BOOK TABLE

"INDIA RUBBER." BY HENRY P. STEVENS, M. A., PH. D., F. I. C. Reprinted from the Reports of the Progress of Applied Chemistry, Vol. V, 1920, issued by the Society of Chemical Industries, London.

To the busy man this summary of what has been recorded in rubber literature during the past year is particularly welcome. The author finds no event comparable to Peachey's cold vulcanizing process; but he notes much interesting progress in various lines of research, as, for instance, on the reactions among the materials employed in the Peachey process.

As to production of the raw material, he estimates that plantation rubber now represents 89.5 per cent of the world's output, and that the excess this year will likely be 50,000 tons, with a total plantation production of 343,000 tons as compared with 302,000 in 1919. There is but little change in the output of wild rubber, especially Brazilian.

Commenting on plantation researches, he cites specific gravity tests that seem to reveal incipient disease in latex-bearing trees and tells how to improve them. He tells of tapping experiments toward obtaining the best latex; the effect on subsequent vulcanization of soaking coagulum; the inability to correct mould trouble on sheets; the effect of air in maturing rubber; the question of the superior uniformity of fine hard Pará over plantation rubber; how the vulcanizing mass expands in proportion to the high rubber content and the extent of milling; what results have attended the extensive study of accelerators, and why some results of much practical value are expected from experiments being made on the reaction of raw rubber to the bromine addition product.

Of much interest is the author's view of the tests made with compounding ingredients, zinc oxide and carbon black being especially favorable; on the aging of raw and vulcanized rubber; on the interpretation of the rubber stress-strain curves; on synthetic rubber, which still fails to excel the most inferior dark plantation crêpe when vulcanized; and of the newest methods of estimating sulphur in vulcanized rubber, the action of antimony in compounding, on modes of estimating the rubber hydrocarbon in raw and vulcanized rubber, and of determining cellulose in vulcanized products.

RUBBER, RESINS, PAINTS AND VARNISHES. BY R. S. MORRELL, M. A., Ph. D., F. I. C., and A. de Waele, A. I. C. D. Van Nostrand Co., New York, 1920. Cloth, 236 pages, 5¼ by 8½ inches.

This is one of a series of text-books on the chemical industries from the chemical rather than the engineering standpoint, giving a general survey of the industry, showing how chemical principles have been applied and the influence of new inventions.

The volume is divided into five parts: (1) The Rubber Hydrocarbons; (2) Drying Oils; (3) Resins and Pitches; (4) Pigments and Paints; (5) Varnishes. The section on rubber discusses the British rubber plantation industry and the work of the Agricultural Departments in the Far East. This is followed by an account of the formation in nature, the distribution of the raw materials of rubber and the rubber-bearing species. The physical and chemical properties of latex are treated at length, and also the chemistry and physical testing of rubber. Hot and cold vulcanization are mentioned briefly, and the manufacture of a few typical articles briefly described.

Gutta percha is referred to and the subject of rubber substitutes touched upon. Rubber-seed oils, as yet undeveloped industrially, are destined to have well-merited industrial importance, and receive in this book a condensed account of yield, composition and uses. The important matter of diseases and pests has been carefully studied, both in Ceylon and in Malaya, and the most important ones are summarized. The rubber section closes with a discussion of synthetic rubber and a bibliography.

The section on resins and pitches will have interest for the rubber chemist in connection with their use in rubber compounding, and the same is true of the section on paints and pigments.

"THE FINANCIER RUBBER SHARE HANDBOOK." SEVENTEENTH edition, January, 1921. The Financier and Bullionist, Limited, 49 Wood Exchange, London, E. C. 2. Cloth, 928 pages, 4¾ by 7¼ inches.

"The Financier Rubber Share Handbook" has long been the authoritative source of information on the financial affairs of British rubber plantation companies. It is of interest to note in the preface to the present edition that the present crisis in the plantation industry may yet prove a blessing by bringing about closer unity in the industry for control over further planting whereby production can be held in adjustment to the world's requirements as a safeguard against the recurrence of crises. More economical methods will be evolved and prohibitive labor costs be modified Estates operating under undue disadvantages of soil, climate, etc., will go out of cultivation under the law of survival of the fittest, which will operate to an extent limited only by the duration of the crisis.

"GENERAL COMMODITY SALES TAX." BY DR. HENRY A. E. Chandler. *Commerce Monthly*, March, 1921, issued by the National Bank of Commerce, New York.

A timely and comprehensive dissertation on the proposition to impose a levy on the sales of all merchandise in order to augment the Federal revenue. The economist of the noted financial institution points out that the receipts of the Government, now insufficient to meet its immense war obligations, could be substantially increased and inequities in the present fiscal system largely corrected by the levying of an impost on sales to the extent of 3/10 of one per cent, and in no case in excess of ½ of one per cent, instead of at the rate of one per cent as some have urged. Dr. Chandler regards such new source of raising revenue as the least objectionable means of raising money indirectly, but he argues that as the effect of the tax would be to throw the larger part of the burden upon the masses who have the smaller incomes, such a levy should be minimized as far as possible so as not to cause undue hardship. Even at 3/10 of one per cent he estimates the yield would be about $516,000,000; and with such a moderate rate few could reasonably expect exemptions and the task of collection would accordingly be much simplified.

"A LIST OF THE FUNGI OF THE MALAY PENINSULA." BY T. F. Chipp. *Botanic Gardens' Bulletin*, Singapore, Straits Settlements. January 7, 1921, Nos. 9, 10, 11. Paper, 107 pages, 6 by 9¼ inches.

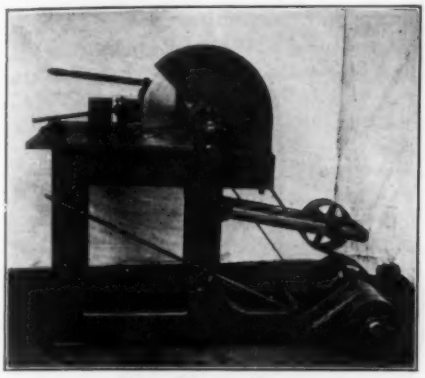
A work of much scientific interest and potential value to producers, shippers, dealers, and consumers of crude rubber, is this complete enumeration and description of the fungus growths of Malaya. The author amplifies the information he conveyed in his monograph, "The Fungus Flora of *Hevea brasiliensis*," and adds much to that imparted by other mycologists who have done notable research work in identifying the many moulds, mildews, rusts, smuts, and various forms of low plant growths which attack rubber trees and their product.

The work of the mycologists and those aiding them in finding the cause and cure of the various diseases which attack latex-bearing trees and cause the spotting on prepared rubber has assumed great importance. Hence it is gratifying to note this important contribution to the literature on this subject, which cannot fail to stimulate closer study of the most effective means for lessening the ravages of fungoid growths on rubber estates.

New Machines and Appliances

TIRE SECTION CUTTING MACHINE

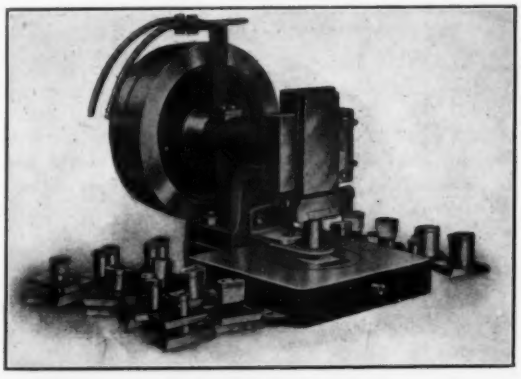
A VERY substantially built and simple machine designed for cutting sample sections of rubber goods such as hose, belting or tires and possibly crude rubber, is herewith illustrated. It consists of a circular knife of generous diameter well housed and mounted on a cast-iron frame. The machine is belt-driven and controlled by an idler. A movable table for supporting the stock to be sectioned is mounted on two side brackets and a lever-operated clamp is provided for holding the work.—The Banner Machine Co., Columbiana, Ohio.



TIRE SAMPLE CUTTER.

RUBBER SOLE AND HEEL PUNCHING MACHINE

A quick-acting punch of English design for punching rubber blanks for heels and soles is shown in the accompanying illustration. The punches are mounted to fit into a dove-tailed slot so that they cannot be set incorrectly and do not require adjustment



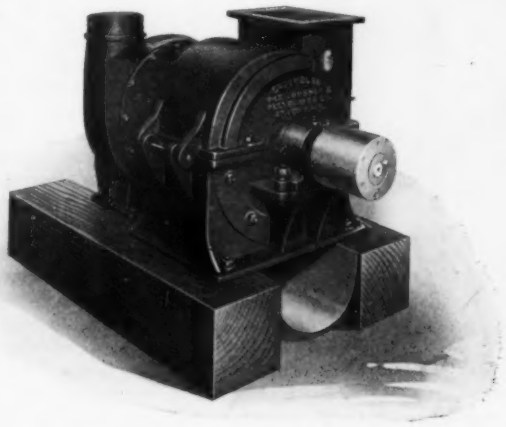
SOLE AND HEEL PUNCH

of setting. When the die is fixed to the machine, it is flush with the surface of the base. Circular punches range from 1¼-inch to 2¾-inch, the sizes below 1¾-inch are made as twin cutters. For the larger sizes, the speed is 120 revolutions per minute, turning out 120 disks per minute, or 240 disks when using the twin cutters.—C. A. Harnden, Limited, Hyde, Manchester, England.

RUBBER SCRAP PULVERIZER

Hard rubber scrap and broken phonograph records may be pulverized to the fineness of 20-mesh or under in one operation by the machine here illustrated. The machine is simple in construction, durably made, and adapted for hard continuous service. The pulverizing is done by a set of revolving hammers of which there are 500 or more in each machine. The material is held in place by perforated screens or grate bars which do not allow anything to pass out until it is fine enough to go through the openings. Either coarse or fine grinding may be done by changing the screen or grates—an operation requiring but a few minutes. A metal pocket prevents foreign material, such as stones, bolts, iron or steel from getting into the machine. Such extraneous matter is thrown out before it enters the hopper by an air-regulated device.

The encasement of the machine is heavy cast iron. The pulverizer shaft revolves at high speed and is furnished with disks of highly tempered steel. The grate bars and plates are made with perforations and openings ranging in size from one inch to 1/64-

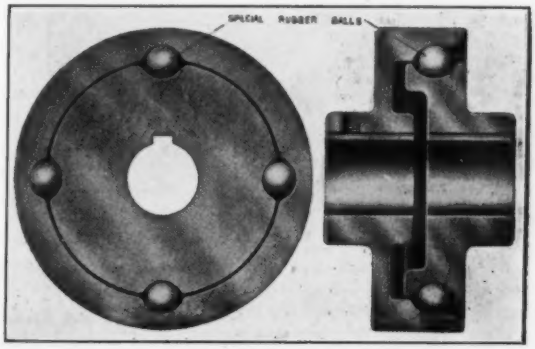


THE GRUENDLER PULVERIZER

inch in diameter. The grates are interchangeable and constructed in individual units of various sizes. Oversize ball bearings assure quick, easy starting and smooth running. The pulverizers are made in sizes ranging from 3 to 300-ton capacity daily and require from 5 to 200 h.p., depending upon their size. It is claimed that in view of the great capacity of the machine, the production per unit requires from thirty to forty per cent less power. A two years' guaranty against defects in material or workmanship is given with each outfit.—Gruendler Patent Crusher & Pulverizer Co., St. Louis, Missouri.

A BRITISH FLEXIBLE COUPLING

The illustration shows sectional views of a patent flexible coupling featured by a Scottish firm of rubber machinery



FLEXIBLE INSULATING COUPLING

specialists. Flexibility and insulating effect is due to four special grade rubber balls set in special cavities arranged at

90-degree intervals in either half of the coupling.—R. Fauset Gillespie & Co., Edinburgh, Scotland.

TIRE-SKIVING MACHINE

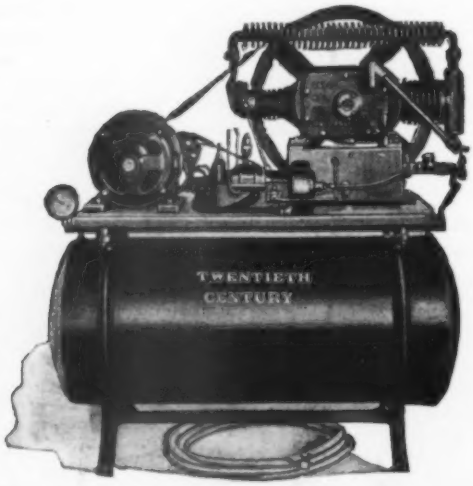
Worn out or cut tires that can no longer be used, represent an enormous outlay of money that apparently is lost. However, the advent of a tire-skiving machine of the type shown in the accompanying illustration, offers a means of utilizing old automobile or motorcycle tires, as reliners, retreads, inner liners, side-wall support molds, vulcanizing and blow-out patches.

THE MAXWELL TIRE SKIVER

The machine has a heavy cast-iron cylindrical pedestal that is bolted permanently in place. Power for operation is derived from a belt pulley connected with the main shaft. The revolving rollers, which carry the tire, are adjustable for the different sizes and styles of tires. The skiving knife is also adjustable to slice off the bead to a feather edge, or to skive any distance from the toe of the bead. The cutting operation is facilitated by water dropped at regular intervals on the knife from the little water tank mounted on the protective guard of the knife. The tire is placed on rollers, the knife set, then the power turned on. The tire will be skived with a clean cut, completely through the material.—Maxwell Manufacturing Co., Wichita, Kansas.

AIR COMPRESSOR FOR GARAGES AND VULCANIZING SHOPS

In this compressor the air is forced from the larger cylinder through the cooler into the smaller cylinder, giving a relative



GASCO TWO-STAGE AIR COMPRESSOR

capacity of the two cylinders of 4 to 1, which is claimed to be greater than a single-cylinder compressor of its size.

Both cylinders and crank cases are cast in one and machined in one operation, insuring perfect alinement. The crank shaft is drop-forged 1⅜-inch diameter, machined and ground. The main bearing is of phosphor bronze, 2⅛ by 2 inches, and is interchangeable. The compressor is so designed that the hole through which the piston enters may be opened at any time without removing the belts. The cylinders are 3 inches and 1½ inches, cast in block, with 3-inch piston stroke—speed 200 to 250 r. p. m. The maximum pressure is 200 pounds. The ½-h.p. motor is either for direct or alternating current. The air tank is guaranteed 150 pounds working pressure. All the fittings are of the best material. The height of the compressor over all is 43 inches and the floor space 19 by 40 inches.—Gasco Manufacturing Co., Lancaster, Pennsylvania.

RECORDING THERMOMETER

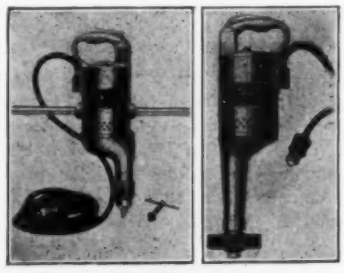
A new recording thermometer is here illustrated, combining many new features and constructional advantages. For instance, a rubber gasket fits tightly in the door and is squeezed together when the door is fastened down, making the instrument dust and

THE BROWN THERMOMETER

moisture proof. An automatic pen release lifts the pen from the paper automatically when the chart is being changed, and replaces it when the door is closed. A special designed chart knob with a few turns grips the chart tightly. The chart clips are mounted on the door and swing aside automatically when the door is opened, without the necessity of slipping the chart under each clip.—The Brown Instrument Co., Philadelphia, Pennsylvania.

SMALL ELECTRIC TOOLS FOR RUBBER FACTORIES

Both the portable electric drill and electric grinder shown in the picture herewith are motor driven, using direct or alternating current, and automatically stop when not in use. This is due to the fact that the current contact functions through a spring lever in the handle which is released as soon as the pressure of the operator's grip is removed, much on the same order as the valve on a pneumatic hammer. The switch is a quick make and break, located in the top handle and operated by the palm of the hand. The casings of the motors are of high-grade aluminum. Self-oiling ball bearings are used throughout. Motor windings are protected from any possible injury by the liquid tight grease compartments for the gears. The motors will stand severe usage and overloading. Ten feet of extra heavy flexible cord is furnished with each equipment.

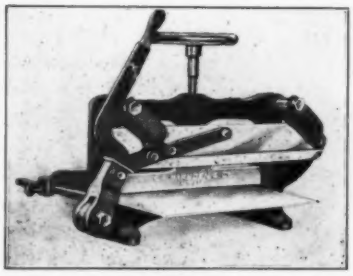


WODACK ELECTRIC DRILL AND GRINDER

The electric drill is a handy tool for the machine shop. The electric grinder is designed for buffing, polishing, removing brands or imperfections from finished tires.—Wodack Electric Tool Corporation, 23-27 South Jefferson street, Chicago, Illinois.

RUBBER STOCK CUTTER

The accompanying illustration shows a very strongly built hand-operated stock cutting knife adapted for cutting tubed rubber stock for mold work or plied up rubberized fabric to be crosscut into strips. It is made by a firm that specializes in machinery for cutting fabrics, paper, silk and leather substitutes.—C. A. Harnden & Co., Hyde, near Manchester, England.



GUILLOTINE CUTTER

MACHINERY PATENTS

MACHINES FOR COMPACTING CARBON BLACK

How to suppress the excessive dust resulting from the extensive use of carbon black in tire stocks has taxed the inventive skill of rubber engineers. The special machines described below are designed to simplify the black mixing problem by the elimination of most of the contained air and the delivery of the black in a compact condition.

Fig. 1 shows the hydraulic press in vertical cross-section. It consists of a base *A* containing a fluid pressure chamber *B* carrying lugs *C* through which bolts connect similar lugs *D* of an upper chambered member *E*. The latter is closed by a cap *F* hinged at *G* and latched at *H*. Through the top of *F* are ducts *I* for the escape of the air entrapped in the carbon black confined in the chamber *E* as pressure is brought to bear upon the material by the upward movement of the ram *J*. The escape of carbon black is prevented by a cloth screen *K* held between the top of the chamber *L* and the cover cap *F*.—William W. McMahan, assignor to Morgan & Wright, Detroit, Michigan. United States patent No. 1,372,181.

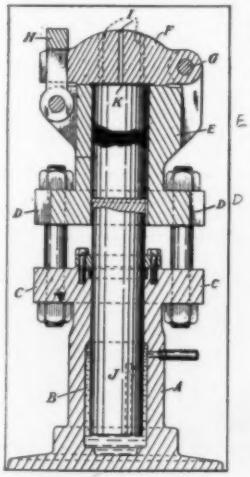


FIG. 1. CARBON BLACK PRESS

In the machine shown in Fig. 2, an outer vessel *A* has a cover *B* arranged for being tightly bolted on; a gasket clamped by a suitable ring device; a rubberized bag *C* forming a collapsible lining to *A* and a receptacle for the cloth bag *D* containing the carbon black to be compressed. An interconnecting system of piping communicates with the interior and exterior of the rubberized bag *C*. In operation the air is exhausted from the inside of the bag *C*, causing the air in the material in the bag *D* to escape through the bag walls by way of the upper pipe passages. After the air has been exhausted, fluid under pressure is admitted to the outside of the bag *C*, which is accordingly compressed around the bag *D* and thus compacts the material in *D* to a much reduced bulk.—Chester J. Randall and Richard R. Taylor, assignors to Goodyear's Metallic Rubber Shoe Co., all of Naugatuck, Connecticut. United States patent No. 1,372,190.

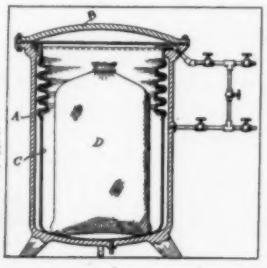
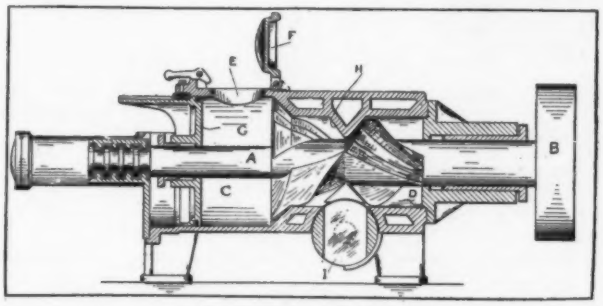


FIG. 2. APPARATUS FOR COMPACTING CARBON BLACK

RUBBER MASTICATOR AND MIXER

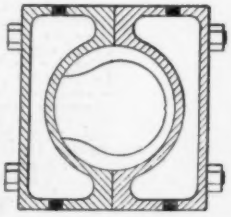
The enclosed masticator and mixer shown in longitudinal section in the illustration, comprises a rotor *A* driven by a gear *B* in a two-chambered casing *C* and *D*. The rubber and ingredients to be mixed are placed in *C* through an opening *E*, which may be closed by the door *F*. In chamber *C* is a hydraulic piston *G*, which forces the contents of the chamber into the working chamber *D* when it is extruded by the rotor *A*, forward and back through a limited opening between the rib *H* and the rotor. The effect is to plasticize and smear the mixture against the interior surfaces of chamber *D* and combine the ingredients in intimate mixture. The chamber *D* is provided with hollow walls for the circulation of water for cooling the materials below the heat of vulcanization. At the end of the mixing operation the contents of the working chamber are emptied by gravity through a special valve *I* on the lower side of the working chamber *D*.—D. R. Bowen and C. F. Schnuck, assignors to Farrel Foundry & Machine Co., Ansonia, Connecticut. United States patents Nos. 1,354,452, 1,355,305 and 1,356,691.



FARREL ENCLOSED MIXER

COVERING TENNIS BALLS

An improvement in covering tennis balls which consists in wrapping pieces of a multipiece fabric cover around a rubber ball and abutting the edges of the cover without distorting pressure upon the ball, the cover pieces being of larger total area than the surface area of the rubber center. The oversize cover is then compacted into a smooth, snug fit upon the rubber ball by heating the molds and cooling the ball before removing from the molds.—A. G. Spalding & Brothers, Chicopee, assignee of Frank J. Faulkner, Lynn, both in Massachusetts, U. S. A., Canadian patent No. 208,269.



TENNIS BALL MOLD

OTHER MACHINERY PATENTS

THE UNITED STATES

NO. 1,372,799 Tire repair vulcanizing device. J. J. Cotter, Philadelphia, Pa.

1,373,212 Fabric cutting and winding apparatus. W. C. Tyler, Racine, Wis., and A. H. Koza, Akron, O., assignors to The Goodyear Tire & Rubber Co., Akron, O.

1,373,228 Expansible collapsible tire core. W. G. Fording, Cleveland, O.

1,373,229 Expansible and collapsible tire core. W. G. Fording, Lakewood, O.
1,373,389 Tire mold. G. H. Witsaman, assignor of one-half to W. B. Ruston—both of Dayton, O.
1,373,807 Tire repair vulcanizer. O. M. Fredd, Hancock, Mich.
1,374,371 Footwear repair vulcanizer. W. H. Foster, Bad Axe, Mich.
1,374,449 Tire stitcher and stitcher mounting. W. B. Harsel, assignor to The Goodyear Tire & Rubber Co.—both of Akron, O.
1,374,463 Machine for manufacturing asbestos gaskets. E. Nall, deceased, by E. A. Nall, executrix, assignor to The Goodyear Tire & Rubber Co.—both of Akron, O. Original application divided.
1,374,584 Apparatus for making inner tubes. H. C. Knecht, Akron, O.
1,374,805 Mold and process for rebuilding tires. H. G. Ballou, Los Angeles, Calif.
1,375,214 Expansible core and tire mold. B. Darrow, assignor to The Goodyear Tire & Rubber Co.—both of Akron, O.
1,375,468 Apparatus and method for treating selvage. M. A. Replogle, assignor to The Goodyear Tire & Rubber Co.—both of Akron, O.
1,375,473 Mold for vulcanizing endless belts. C. L. Smith and E. S. Webster—both of South Bend, Ind.
1,375,528 Apparatus and method for tire retreading. J. H. Miller, San Luis Obispo, Calif.
1,375,542 Equipment for vulcanizing tire casings. J. Traum, Coshocton, O.
1,375,543 Tire mold. E. H. Trump, Barberton, O.
1,375,655 Insulated wire covering machine. J. A. Heany, New York, N. Y., assignor by mesne assignments to Rockbestos Products Corporation, a Delaware corporation.
1,375,660 Interlocking tire mold. K. B. Kilborn, assignor to The Goodyear Tire & Rubber Co.—both of Akron, O.
1,375,989 Cutting machine, suitable for cloth, sheet rubber, etc. J. E. Williams, Chicago, Ill., assignor to Eastman Machine Co., Buffalo, N. Y.
1,376,018 Machine for trimming overflow from rubber heels. T. E. Kane, assignor of one-half to A. Sydeman—both of Boston, Mass.
1,376,123 Apparatus for molding tires. C. W. Stickel. Rochester, assignor to Good Luck Tire & Rubber Co., Buffalo—both in N. Y.
1,376,149 Tire repair vulcanizer. F. O. Melin, assignor of one-half to L. H. Peterson—both of Omaha, Neb
1,376,196 Tire repair vulcanizing mold. O. M. Fredd, Hancock, Mich.

REISSUES

15,076 Vulcanizing apparatus and process. E. Fetter, assignor to The Pneumatic Tube Steam Splicer Co.—both of Baltimore, Md. Original No. 1,312,029, dated August 5, 1919.

THE DOMINION OF CANADA

209,865 Tire press. W. E. Hardeman, Birmingham, Eng.
210,425 Tire-making machine. The Goodyear Tire & Rubber Co., Akron, O., assignee of W. C. Tyler, Racine, Wis.—both in U. S. A.
210,426 Apparatus for attaching tire bases to rims. The Goodyear Tire & Rubber Co., assignee of E. A. Nall, administratrix of E. Nall, deceased—both of Akron, Ohio, U. S. A.
210,427 Tire treading machine. The Goodyear Tire & Rubber Co., assignee of K. B. Kilborn—both of Akron, Ohio, U. S. A.
210,428 Stitching unit of tire-making machinery. The Goodyear Tire & Rubber Co., assignee of W. B. Harsel—both of Akron, Ohio, U. S. A.
210,429 Machine for making tires. The Goodyear Tire & Rubber Co., assignee of W. B. Harsel—both of Akron, Ohio, U. S. A.
210,431 Marker for tires. The Goodyear Tire & Rubber Co., assignee of W. B. Harsel—both of Akron, Ohio, U. S. A.
210,729 Tire-treading machine. The Dunlop Rubber Co., Limited, London, assignee of C. Macbeth, Birmingham, Warwick—both in Eng.
210,731 Tire-building machine. The Goodyear Tire & Rubber Co., assignee of E. G. Templeton—both of Akron, Ohio, U. S. A.
210,732 Apparatus for producing cord tire fabric. The Goodyear Tire & Rubber Co., assignee of F. A. Seiberling—both of Akron, Ohio, U. S. A.
210,816 Mold for pneumatic tires. S. J. Glenn and S. H. Moore, coinventors—both of Brampton, Ont.
211,050 Mandrel for marking inner tubes, and method of manufacture. The Republic Tool & Manufacturing Co., assignee of C. E. Lewe—both of Cleveland, Ohio, U. S. A.

THE UNITED KINGDOM

157,112 Machine for making studded tire covers. E. Janik, 1 E, Karl Ludwigstrasse, Vienna. (Not yet accepted.)
157,113 Apparatus for making studded tire covers. E. Janik, 1 E. Karl Ludwigstrasse, Vienna. (Not yet accepted.)
157,114 Machine for making studded tire covers. E. Janik, 1 E. Karl Ludwigstrasse, Vienna. (Not yet accepted.)
157,115 Machine for making studded tire covers. E. Janik, 1 E. Karl Ludwigstrasse, Vienna. (Not yet accepted.)
157,150 Tire core provided with spacing members to insure adequate transverse stretching during vulcanization. Federal Rubber Co., Cudahy, assignee of A. A. Frank, Milwaukee, both in Wis., U. S. A. (Not yet accepted.)
157,317 Mechanism for making studded tire covers. E. Janik, 1 E. Karl Ludwigstrasse, Vienna. (Not yet accepted.)
157,412 Apparatus for vulcanizing tires. F. T. Roberts, Cleveland, Ohio, U. S. A. (Not yet accepted.)
157,413 Mold for vulcanizing rubber, composed of 97 per cent aluminum and 3 per cent magnesium. F. T. Roberts, Cleveland, Ohio, U. S. A. (Not yet accepted.)
157,479 Apparatus for reducing or extinguishing the burner flame of a vulcanizer. W. Frost and H. Frost & Co., Limited.
157,829 Machine for mixing and masticating rubber. Farrel Foundry & Machine Co., 30 Main street, assignee of D. R. Bowen, 5 Clover street, and C. F. Schnuck, 80 North State street—all in Ansonia, Conn., U. S. A. (Not yet accepted.)
158,054 Device for testing physical qualities of materials. H. L. Scott, 45 Mawney street, Providence, Rhode Island, U. S. A.
158,279 Machine for mixing or masticating rubber. Farrel Foundry & Machine Co., 30 Main street, assignee of D. R. Bowen, 5 Clover street, and C. F. Schnuck, 80 North State street—all in Ansonia, Conn., U. S. A. (Not yet accepted.)
159,015 Apparatus for cutting rubber, slicing uncured rubber for boot heels, etc. Wood-Milne, Limited, 42 Wigmore street, London, and B. C. Barton, 13 Park street, Lytham, Lancashire.
159,106 Apparatus for treating rubber. S. C. Davidson, Sirocco Engineering Works, Belfast.

GERMANY

DESIGN PATENTS ISSUED, WITH DATES OF ISSUE

769,608 (January 22, 1921.) Attacher for rubber soles and heels. Ernst Block, Benderstrasse 93, Düsseldorf-Gerresheim.
770,878 (January 6, 1921.) Arrangement for attaching soles and heels of rubber or other material to footwear by means of cements. Karl Ehmann, Neckarsteinach.
770,922 (February 22, 1921.) Tin vulcanizing mold composed of two parts. Fleming & Cie., G. m. b. H., Charlottenburg.
770,925 (February 22, 1921.) Tin vulcanizing mold composed of two parts. Fleming & Cie., G. m. b. H., Charlottenburg.
770,926 (February 22, 1921.) Vulcanizing molds. Fleming & Cie., G. m. b. H., Charlottenburg.
772,192 (March 4, 1921.) Container for vulcanizing masses of rubber. Alexander Herzog, Karlsbad; represented by A. Elliot, Berlin, S. W. 48.
772,877 (March 14, 1921.) Sawing-machine for hair combs. Firma Eduard Meeh, P. Sorzheim.
773,405 (March 15, 1921.) Vulcanizing mold. Fleming & Cie., G. m. b. H., Charlottenburg.
773,898 (February 22, 1921.) Vulcanizing mold composed of two parts. Fleming & Cie., G. m. b. H., Charlottenburg.

PROCESS PATENTS

THE UNITED STATES

NO. 1,373,094 Construction of tire carcasses from tubular fabric. A. E. Preyer, New York, N. Y.
1,374,505 Manufacture of fabric tires. E. Hopkinson, New York, N. Y.
1,374,846 Repairing tire casings. F. D. Goodlake, West Palm Beach, Fla.

THE UNITED KINGDOM

157,742 Coating tire valves, etc., to prevent rusting. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, N. Y., assignee of M. C. Schweinert, 42 Riverside Drive, New York, and H. P. Kraft, 219 Godwin avenue, Ridgewood, N. J.—all in U. S. A. (Not yet accepted.)
157,783 Manufacturing boot soles from old tires. U. Chandeysson, 44 rue Lamartine, Nice, France. (Not yet accepted.)
157,792 Utilizing waste rubber tires in manufacture of boots, gaiters, belts, etc. U. Chandeysson, 44 rue Lamartine, Nice, France. (Not yet accepted.)
157,978 Coagulating latex. E. Hopkinson, 1796 Broadway, New York, U. S. A. (Not yet accepted.)

GERMANY

PATENTS ISSUED WITH DATES OF ISSUE

336,363 (January 30, 1920.) Cutting garment protectors. Deutsche Kabelwerke A. G., Berlin.
336,518 (October 24, 1919.) Manufacture of non-scratching brushes and combs. Bohumil Jirotka, Bellcalliance strasse 13, and Heinrich Küchenmeister, Fürtherstrasse 1—both in Berlin.
336,918 (June 9, 1914.) Repairing tire covers. F. W. Farr, Northampton, England represented by R. Geissler, Berlin, S. W. 11.

DESIGN PATENTS ISSUED WITH DATES OF ISSUE

765,467 (April 6, 1920.) Method of vulcanizing rubber tires. L. Schetter & Co., Cologne.
772,213 (January 13, 1920.) Method for pumping automobile tubes next to the motor. Johann Peter No, Bendorf on the Rhine.
772,271 (March 4, 1921.) Mounting tires and tubes on bicycles. Anton Kreidler, Trossingen.

TIRE CONTAINER TAKING FIRST-CLASS FREIGHT RATE

The "Handy" tire shipping case is made in five sizes. The three most common will hold 14, 9 and 8 tires, respectively. Two special containers are provided for large-sized tires. The center wires and a closing machine are furnished by the manufacturer. Tires packed in these containers take the first-class freight rates in almost every part of the United States. The maximum weight limit of the container is 225 pounds, and the weight of the package is approximately 11 pounds. The "Handy" comes in collapsed condition, and to fill it with tires, open the container and stand it on one end, inserting a tire, fold down the end and bring the wires to center, then reverse the case and fill, folding in the end and thread the center rod through the wire loop ends, fastening securely with the closing machine.—The Ohio Boxboard Co., Rittman, Ohio.

TEN TIRES READY FOR SHIPMENT

New Goods and Specialties

BALL WITH FEATURES AND PROJECTIVE TONGUE

THIS toy is formed of a hollow spherical rubber body, which is molded to represent a human head with nose, eyes, ears, and hair either stamped, painted or molded thereon; and an elliptical-shaped opening to provide a mouth. The tongue is of thinner rubber than the ball, colored red, tapering on one end, and the open end is secured to the ball inside the mouth-opening by vulcanizing or other suitable method.

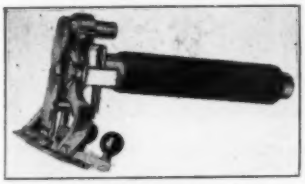
"TONGUE-BALL"

Upon squeezing or depressing the sides of the ball with the fingers, the tongue is forced outward by the air compressed therein; while, when the pressure is released, air suction withdraws the tongue into the ball. The "tongue-ball," when depressed, simulates the appearance of a head sticking out the tongue.

It is, of course, possible to mold any desired face, from that of an attractive child to one of a grotesque clown. In this way a line of distinctly amusing and entertaining toys may be put out, all employing some application of the darting tongue.—United States patent No. 1,352,047. Rudolf W. Boje, Jr., 106 Goembel avenue, Buffalo, New York.

ELECTRICAL CLIPPER WITH HARD RUBBER HANDLE AND KNOBS

Of interest to the artist of shears and razors is a new electric hair clipper which is driven by a flexible shaft connecting at the end of one handle. The mechanism for oscillating the upper cutting plate is of novel construction. A vertical lever, pinned at its top, swings the plate back and forth. The blade angle is adjusted by pressure of the hand against a spring. As with many electrical devices in practical use, the handle and the two large thumb knobs are of hard rubber.—The Barbers' Electric Specialty Co., 4204 Troost avenue, Kansas City, Missouri.



COFFMAN ELECTRIC HAIR CUTTER

RUBBER SHAVING AND LATHER CUPS

A rubber bowl-shaped shaving-cup having a circular opening in the bottom of the cup, into which a stick of shaving soap is inserted, will be of interest to the clumsy man who is continually chipping and cracking the highly ornamented china shaving cup with which women so delight in supplying him. The soap can be removed after using, and returned to the metal container in which it is purchased, while the cup is easily washed and, being flexible, occupies little space. The lather-cup differs from the shaving-cup in that it has a large base on which are small rubber massage projections, and into the circular recess in the inside bottom of the cup may be fitted a small piece of soap.—United States patents Nos. 1,369,766 and 1,369,767. Lewis A. Amis, Muskogee, Oklahoma.

SHAVING-CUP

LATHER-CUP

HARD RUBBER CARBOY FOR ACIDS

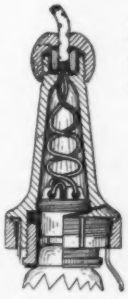
The illustration shows a 29-gallon carboy made of all hard rubber. This carboy is used for handling strong acids, strong alkalies and other corrosive liquids such as nitric acid, sulphuric acid, hydrochloric acid, hydrofluoric acid, sodium or potassium hydrate, and blue, white or green vitriol, etc. The carboy is fitted with a tapered stopper which prevents the acid fumes from escaping. The manufacturer claims that as far as known this is the largest one-piece closed article ever produced from hard rubber. The process employed in manufacturing requires the skill of an experienced worker.

LARGEST RUBBER CARBOY

As many violently active acids and corrosive liquids have absolutely no effect upon hard rubber this carboy is in great demand. In addition to the carboy this company manufactures pails, funnels, scoops, dippers, measures, tanks, etc.

This equipment is used for the handling and conveying of fruit juices, preserves, mustard, near beer and many other products in addition to acids and alkalies.—American Hard Rubber Co., 10 Mercer street, New York, New York.

IMPROVED PORTABLE HAND LAMP



PORTABLE HAND LAMP

A new corrosion-proof type of portable hand lamp for use in damp and corrosive situations, especially in chemical works, boiler houses, etc., is guaranteed to have no screws or wing nuts to affix the guard, no screws to secure the leather hanger, no porcelain parts to get broken, no broken connections, no special tools or keys required, no corroded terminals and no shocks. All parts are fireproof, heat resisting and interchangeable. It will take carbon lamps up to 50 c.p. and metal filament up to 60 watts. The lamp has a rubber gasket and a rubber cushion. The illustration shows a cross-sectional view.—J. C. White, 1 Cumberland street, Manchester, England.

AN ATTRACTIVE BROGUE RUBBER

Distinctly in line with the movement to induce Canadians to buy goods made in Canada is the apparent effort on the part of Canadian manufacturers to see that their products are in every respect as good as those made in the States.

THE "BROGUE" RUBBER

The accompanying illustration gives an idea of how closely the popularity of the leather brogue has been followed by footwear manufacturers. It shows a new-style rubber, a light-brown croquet with a lavender lining and the wing tip and heel foxing perforated and pinked in exact imitation of the much-favored brogue. This rubber, worn with a low-heeled walking boot having a medium-weight sole, produces almost exactly the effect of wearing a real brogue, and at considerably less cost.—Ames Holden McCready Limited, Montreal, Quebec, Canada.

A BARKING DOG THAT DOES NOT BITE

An ingenious Frenchman is the originator and patentee of another newcomer to Happyland in the Country of Children.

"LE ROQUET"

"Le Roquet" is a barky dog. The dog is a sure enough "hound dawg" with a bright green collar and is bound to delight the heart of any youngster. The metal dog head with a wide-open red mouth, is attached to an unusual-shaped rubber bulb. The bulb is made up in four sections and cemented together. From the neck of the bulb upward almost to the top of the head extends a metal tube. Across the bottom is fastened a narrow bit of rubber band. The compressed air from the bulb is forced outward through the pipe or tube against the head and causes a most lifelike yap.

HOME DOCTORING FOR WEAK DOLLS

No longer is it necessary for Little Mamma, when Dolly is wobbly and no longer able to stand alone, to send her to the hospital and spend many days in sad waiting for her return, with strength adequate to stand the strain of youthful devotion. A kind and thoughtful inventor has perfected an improved "Dolly Dimples" rubber elastic in two pieces that fit dolls from 10 to 14 inches up to 36 to 48 inches in height, which are packed not only for hospital use, but for retailing. Special elastics for character infant dolls are also manufactured for both retail and hospital trade. The insertion of the elastics is very simple. The arms and legs move freely and retain the position in which they are placed.—Fred K. Braitling, Bridgeport, Connecticut.


DOLL REPAIR ELASTICS

NOVELTIES IN COMPLETE RUBBER BATHING COSTUMES

Talented modistes on the Pacific Coast have been vying with one another in designing beach costumes of rubber, and several of the "creations" have made a decided hit at the pre-view exhibits given at some of the fashionable hotels. The only complaint made about the rubber garments was that they tore easily. The makers investigated and found that some of the young women who posed in the costumes used pins recklessly, thus causing the rents in the garments.


RUBBER BATHING COSTUMES DESIGNED FOR THE UNITED STATES RUBBER CO.

The chief novelty displayed was a so-called "wrappy" cape, full and long enough to merit the term cloak, and much more artistic and stylish than the capes of last season. One model had broad blue and yellow stripes extending lengthwise, and a short blue shoulder cape; another had very broad diagonal stripes of white and blue, the lining being solid black. Another combination was a scarlet cape worn over a blue blouse and skirt suit trimmed with red, coupled with a red sash; one was a sailor-like suit in dark red with green trimming, and a broad white collar; while another costume in black had harem trousers, a white and green checked yoke, and a red and white striped sash.

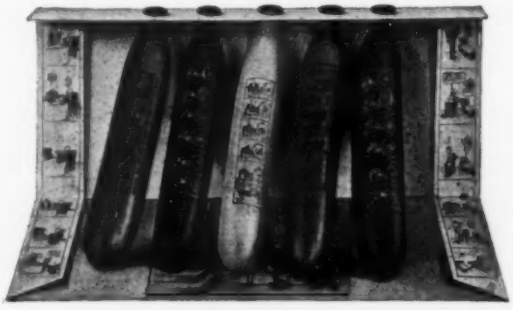
The effectiveness of the costumes was enhanced by rubber caps and hats to match the capes and suits, and bedecked with trimming in complementary colors, bows, rosettes, medallions, and conventional floral designs. The makers avoid what are known as the pastel shades, realizing that the only colors that will stand the intense sunlight are the mineral pigments.

"SEALTYTE" SELF-HEALING INNER TUBE

This leak-proof tube is made of red rubber with the tread portion separated into two layers with plastic rubber inserted between. It is guaranteed to self-heal punctures and give greater service than regular inner tubes. Continual road tests and the most severe laboratory tests have shown that the plastic rubber instantly fills any puncture made in the tube.—Victory Rubber Manufacturing Co., 229 Peachtree street, Atlanta, Georgia.

"MUTT AND JEFF" MAKE ANOTHER PUBLIC APPEARANCE

Mutt and Jeff, of newspaper and movie popularity, are now appearing among the novelties for children in the form of picture balloons. Each balloon has printed upon it six pictures of some of the exploits of the famous long and short comedians. These


MUTT AND JEFF PICTURE BALLOONS

sausage balloons are packed in two types of packages which are lithographed in three colors and carry a series of pictures also. The packages containing two balloons are 3½ by 6¾ inches while those containing five are 4 by 10 inches. The five-balloon packages are put up in various assortments containing balloons of different sizes. The illustration shows five Mutt and Jeff picture balloons in their attractive holder.—The Eagle Rubber Co., Ashland, Ohio.

BRITISH MOTORCYCLE LINK BELT

Motorcyclists who have had the experience of shortening, repunching and refitting fasteners owing to the belt slipping will be interested in the Lee Ellis link belt. It is claimed that once adjusted to the V-shaped pulleys which it fits, there is no stretching; that no fasteners or punchers are required, and that the grip, flexibility and transmission of power are perfect. The belt is made in ¾-inch, ⅞-inch, 1-inch and 1⅛-inch sizes. The illustration shows the links joined up as in the belt, a single steel link and a section of link rubber-covered belt showing the protruding ends of the links. When fitting, the T-shaped end is hooked onto the hook end and when removing, it is simply unhooked.—The Midland Rubber Co., Limited, Ryland street, Birmingham, England.

PARTS OF LEE ELLIS LINK BELT

TO MEET THE NEW GOLF REQUIREMENTS

In these days of regulating everything, from moving pictures to the accessories of sports, the United States Golf Association has not been idle. Consequently, he who would spend his happy week-ends "driving little white pellets over the grass" must see to it that the pellets weigh no more than 1.62 ounces avoirdupois and are not less than 1.62 inches in diameter. The newest golf balls are shown here.

The "Black Diamond," with recessed marking, is a hard wound ball, and meets in size and weight the requirements of the new ruling. This ball is made for the hard hitter, who desires extreme distance. Its cover is said to be particularly durable and its flight approximately perfect.—The Worthington Ball Co., Elyria, Ohio.

The "U. S. Royal 30-X" weighs just under 30 dwt., which is approximately the equivalent of 1.62 avoirdupois ounces. It is distinguished particularly by the fact that its cover is unusually tough and not easily cut. This cover is made in what is known as the six-pole recessed marking. Expert golf players pronounce this ball to be long-driving, controllable on approach shots, and practically perfect in putting qualities.—United States Rubber Co., 1790 Broadway, New York, N. Y.

Another new ball of the long-flying, non-floater type is the "Colonel 1.62," in dimpled and meshed marking, made in the same size as the "Colonel 31." The "Colonel 30," a dimpled ball featured by the same manufacturer, is said to be about equal in popularity, while the "Colonel 27," a floater, in both meshed and dimpled marking, is larger and has great distance.—St. Mungo Manufacturing Co. of America, 121 Sylvan avenue, Newark, New Jersey.

"BLACK DIAMOND" "U. S. ROYAL 30-X" "COLONEL 1.62"

"FLEXYDE" BODY BELTS FOR EVERYBODY

"Flexyde," a rubberized fabric, is used as a substitute for leather or elastic webbing in the making of belts which hold their shape, will not fray, curl, crack or discolor and are pliable. These belts can be washed with soap and water without the slightest injury, this sanitary feature enhancing their value. Marathon "Flexyde" belts are made in two styles, those having the characteristics of fine calf skin, in black, cordovan, gray and white; and those which have the walrus grain, in black and natural finish. Belts are made for men, women, boys and girls.—The Marathon Tire & Rubber Co., Cuyahoga Falls, Ohio.

MARATHON WASHABLE "FLEXYDE" BELT

RUBBER REDUCING SUIT FOR JOCKEYS

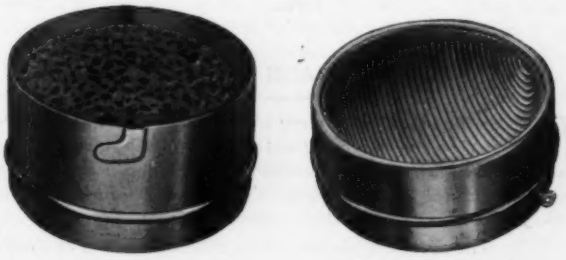
The life of the jockey is not only happy association and training with his much-loved horse, but a severe training to reduce and maintain light weight. Alfred Johnson, said to be the world's greatest post rider, has devised a rubber suit to aid in weight reduction. It is of very thin rubber, in two pieces, the coat lacing all the way down the front, and the pants, slipping over the coat, lace up the front. The suit is tied at the ankles and the wrists. This suit induces perspiration when the wearer is exercising strenuously, and proves a great aid to the reduction of weight.

Central Photo News Service, N. Y.

MANAGER GROH ADJUSTING JOHNSON'S RUBBER SUIT

MUNRO GOLF BALL CLEANERS

The Munro and Junior Munro golf-ball cleaners are composed of two cups set in an aluminum holder. One cup contains a rubber sponge, the other a corrugated rubber mat, supported by an aluminum cup. The wet sponge is rubbed on the golf ball, then the ball is cleaned by a few turns upon the rubber mat, and lastly the ball is rinsed. The rubber mat can be removed and cleaned without difficulty. Each part can be renewed. This is a very small and handy cleaner whose simplicity makes it desirable and serviceable.—The Ellsworth Co., East Orange, New Jersey.



BOTTOM CUP AND SPONGE TOP CUP AND CLEANER

ACTIVITIES OF THE RUBBER ASSOCIATION OF AMERICA, INC.

CARBON BLACK LEGISLATION

THE Association has adopted the following resolution respecting adverse legislation introduced into various states and affecting the carbon black industry:

RESOLUTION

WHEREAS, The Board of Directors of The Rubber Association of America, Inc., has learned that carbon black manufacturers, as represented by the National Gas Products Association, are meeting with severe difficulties in the form of adverse legislation in various states affecting the manufacture of carbon black, and

WHEREAS, Carbon black is a very necessary material in the manufacture of rubber goods in its many forms, the Board of Directors do hereby,

Resolve, That this matter be directed to the attention of the U. S. Bureau of Mines, Washington, D. C.

CHANGES IN CONSOLIDATED FREIGHT CLASSIFICATION NO. 2

Supplement No. 2 to Consolidated Freight Classification No. 2 has been published, effective May 25, 1921, changing ratings on the following rubber products:

The rating on artificial leather or auto top material shipments in any quantity will be fourth class in carloads.

Shipments of crude rubber to points in the South have been changed to second class in less carload and fourth class in carloads.

The rating on fruit-jar rings to points in the South is second class less than carloads and fourth class carloads.

Pneumatic tire valve carload rating of third class with a minimum carload weight of 40,000 pounds has been established to points in official and western classification territories. The rating under the southern classification is unchanged.

Pneumatic tires in wire bound bundles are rated first class in less than carloads to and between points in the South.

Pneumatic tires in paper-wrapped bundles or bales are rated first class in less than carloads, and applicable in official and western classification territories. The effective date will be published later.

CLASSIFICATION OF TIRES IN MISSISSIPPI

The Mississippi Railroad Commission has granted the application and has authorized the publication of the same packing specifications and ratings on pneumatic and solid tires as are now contained in the Southern Classification. This will enable tire manufacturers to follow the same method of packing shipments from branches in Mississippi for movement within that State as now used on shipments on interstate traffic in the South.

FREE STORAGE PERIOD EXTENDED

According to a new ruling the Trunk Line Association will extend the time of free storage at New York railroad piers on less carload shipments for export from two to five days, exclusive of Sundays and holidays, and will not include the day of arrival. Bills of lading and cases should be marked "For Export" and after two days of the period have elapsed, payment for storage can be avoided only through the presentation of a bona-fide vessel permit when calling for the goods.

RUBBER TRADE INQUIRIES

THE inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The Editor is therefore glad to have those interested communicate with him.

(867) The address is desired of the manufacturer of or dealer in a fish-scale composition used in compounding rubber.

(868) A concern dealing in bank supplies desires the addresses of manufacturers of rubber bands.

(869) A reader requests the addresses of manufacturers of dipped goods forms.

(870) Inquiry is made for the addresses of manufacturers of playing-ball machinery.

(871) A manufacturer asks where steam tube splicers can be obtained.

(872) A request has been received for the addresses of manufacturers of sponge rubber in molded form.

(873) A reader desires the address of a manufacturer of machinery for filling tubes with rubber cement.

(874) A manufacturer requests the address of the manufacturer of a machine for uniting rubber sheets.

(875) A reader inquires where he can obtain hard rubber combs.

TRADE OPPORTUNITIES FROM CONSULAR REPORTS

Addresses may be obtained from the Bureau of Foreign and Domestic Commerce, Washington, D. C., or from the following district or cooperative offices. Requests for each address should be on a separate sheet, and state number.

DISTRICT OFFICES.	COOPERATIVE OFFICES.
New York: 734 Customhouse.	Cleveland: Chamber of Commerce.
Boston: 1801 Customhouse.	Cincinnati: Chamber of Commerce; General Freight Agent, Southern Railway, 96 Ingalls Building.
Chicago: 504 Federal Building.	Dayton, Ohio: Dayton Chamber of Commerce.
St. Louis: 402 Third National Bank Building.	Los Angeles: Chamber of Commerce.
New Orleans: 1020 Hibernia Bank Building.	Philadelphia: Chamber of Commerce.
San Francisco: 307 Customhouse.	Portland, Oregon: Chamber of Commerce.
Seattle: 848 Henry Building.	

(34,786) An American citizen, vice-president and manager of a corporation in China, desires to secure representation of manufacturers of automobile accessories suitable for Chinese, Manchurian and Siberian markets.

(34,828) Merchant in Czecho-Slovakia desires to purchase and secure agency for all kinds of rubber goods, rubber coats and dresses, rubber shoes and heels.

(34,877) A firm of commercial representatives in Spain desire to secure the exclusive agency for the sale of automobile tires.

(34,888) A commercial agency firm in India desires to receive manufacturers quotations only on rubber tires for carts and carriages.

(34,896) A trading corporation in Mexico desires to secure prices for new and second-hand tires and tubes.

SAFETY WITH VULCANIZATION APPARATUS

Fourteen points to promote the peace of mind of owners, insurers, and operators of vulcanizing apparatus were ably set forth by Frank Scott, supervisor of inspections for the safety department of Hamlin & Co., New York, at the meeting of the Rubber Division of the Ninth Annual Safety Congress held in Milwaukee, Wisconsin. Old apparatus, with various attachments and clumsily insulated, making internal and external examination difficult, should be banned, he said. Laws were urged to require the removal of all vessels condemned as unsafe to operate at required pressure. The utmost care should be exercised in moving vulcanizers, not only because of danger to men, but of injury to the vulcanizer itself, if it has been long subjected to metal fatigue. Cast iron should be forbidden on large vulcanizers and all should be built according to the American Society of Mechanical Engineers' Boiler Code, namely, of tested material, and subjected to a strain of 1½ times their working pressure before being used.

Regular inspection by boiler specialists should be insisted upon; setting should allow contraction and expansion to eliminate undue wear and strain; safety valves should be provided for all vulcanizers, including belt presses and platen presses, between the reducing valve and connections; employes should be advised of hazards as well as operation; proper drainage should be provided and pipes covered to avert injury from burns; doors should be bolted thoroughly and none opened until the steam gage shows no pressure; no pipes should be used on wrenches, thus avoiding strain on bolts; cars should not be allowed to

bump and perhaps damage the heads; loading tracks should be well fastened to avoid upsetting loads; track bridges should be counterweighted if used to run cars from the floor level to the heater.

Wherever CO_2 vulcanizing apparatus is used care must be taken not to let the CO_2 drums drop; not to remove the top caps of the drums when not charging; the valves between CO_2 drums and tank should be opened, in charging the tank, before the valve on top of the CO_2 drum is opened; care should be taken to see that there are no leaks in the CO_2 tank or piping; to bring pump vulcanizer to zero pressure before opening door; to set all safety valves daily or during each heat; to guard against all leaks and to see that all old gas is discharged outdoors where it cannot harm employes; and to avoid letting the full drum pressure extend to any connection, as the CO_2 drums stand a much higher pressure than any pipe, tank, or fitting connected with them.

THE OBITUARY RECORD

FORMER DIRECTOR, UNITED STATES RUBBER CO.

CHARLES AUGUSTUS HUNTER, who retired from the directorate of the United States Rubber Co. about five years ago, died suddenly on May 3 at his home in North Bergen, New Jersey, at the age of 56.

CHARLES A. HUNTER

Mr. Hunter was born in Monroe, New York, in 1865, and was educated in the public schools of that town and of Paterson, New Jersey. He first engaged in the grocery business in Paterson, his brother joining him a few years later and continuing with him until, in 1891, Mr. Hunter entered the employ of the Peerless Rubber Co., of North Bergen, New Jersey, as shipping clerk.

Within a few years he had worked his way up to superintendent of the plant, and was later made vice-president. Upon the death of Charles H. Dale, in 1908, he was elected president, a position which he held until his retirement from the rubber business. He was also vice-president of the Rubber Goods Manufacturing Co., Mechanical Rubber Co., New York Belting & Packing Co., Fabric Fire Hose Co., Sawyer Belting Co., Stoughton Rubber Co., Chicago Rubber Works, Hartford Rubber Works, Morgan & Wright, Indianapolis Rubber Co., G. & J. Tire Co., Cleveland Rubber Co., Mechanical Fabric Co., Sandy Hook Reclaiming Works and the India Rubber Co.

Following his retirement from the rubber trade he held the positions of secretary and treasurer of the Herfort Co., manufacturers of hardware specialties, until his death.

Mr. Hunter was well known in rubber circles throughout the United States and his untimely passing is widely mourned. He is survived by his widow and two sons.

WELL-KNOWN MID-WEST SALESMAN AND MANAGER

David Shattuck, late manager of the Kansas City branch of the Federal Rubber Co., Cudahy, Wisconsin, died in Kansas City on March 3. He was born in Washington, Maine, December 2, 1869. In 1890 he went to work for the Pope Manufacturing Co., Boston, rising to branch manager of the Chicago headquarters in the thirteen years of his connection with them. In 1903 he became sales representative for the Hartford Rubber Works, Hartford, as the missionary salesman in the bicycle tire line throughout the Middle West. In 1911 Shattuck became sole agent in Kansas City and surrounding territory for the Federal Rubber Co., and in 1916 was appointed manager of the new Kansas City warehouse and sales offices, which position he held at the time of his death.

INVENTOR AND RUBBER PIONEER

Elisha Stout, formerly associated with the Lambertville Rubber Co., died at his home at Asbury Park, New Jersey, May 8, at the age of 83 years. The deceased was a pioneer rubber man and was connected with the Lambertville company for a number of years, having been patentee of the famous "Snag-Proof" rubber boot. During the Civil War he served in the Navy. He is survived by five daughters. Mr. Stout retired from the rubber business some years ago.

READJUSTMENT POLICIES OF THE NATIONAL CHAMBER OF COMMERCE

AMERICAN business, as represented in the membership of the Chamber of Commerce of the United States, gets a clearer view of its problems as a result of the ninth annual meeting of the Chamber, held at Atlantic City, New Jersey, April 26 to 29.

The most pressing questions facing business were taken up earnestly by the delegates attending and out of the presentation of views and the discussions there came a series of declarations intended to point the way to means by which a termination of the present period of business uncertainty may be facilitated.

Because of the importance of the relationships of government and business a general theme for the meeting was chosen in the following phrase: "In the public interest—more business methods in government; less government management of business."

Much of the work of the meeting was done in group sessions, addressed by prominent speakers, where frank discussions took place on the major phases of business problems. The groups were formed to follow the main divisions of business, each group representing a department of the Chamber. The groups were: civic development, domestic distribution, fabricated production, finance, foreign commerce, insurance, natural resources production, railroads and shipping.

DECLARATIONS OF THE CONVENTION

Taxation was one of the principal topics taken up by the meeting. Each division was given an opportunity to express views regarding the sales tax, income taxes and further government loans. The outcome was a resolution to submit the subject again to referendum. The Chamber declared in favor of a court or courts of tax appeals to be appointed by the President, independent of the Treasury Department, to adjudicate disputes between taxpayers and the Bureau of Internal Revenue. Through referendum the Chamber is formally committed to a distinction, for purposes of Federal income tax, between gains realized from the sale of capital assets and income derived from business or other current activities, and it advocates less burdensome rates when properly defined than upon the latter.

The report of progress of the Tariff Committee, suggesting a tariff adjustment board to fix tariff rates within limitations to be defined by statute, thus permitting limited changes in tariff rates without a general revision of the tariff by Congress, will undoubtedly become the basis of an early referendum.

Manufacturers' problems taken up by the fabricated production group included wages and their relation to production and sales; treatment of overhead in stabilizing prices, and the need of statistics in industry. In this connection the Chamber declared for individual initiative, equality of opportunity for all and a wholesome standard of living. It condemned avoidable strikes, lockouts, and all combinations that needlessly limit output or

curtail distribution on the part of workers, owners, or managers of industry. Laws in the various states were urged to promote arbitration as the most economic method of adjusting commercial disputes.

Foreign commerce and trade finance received their due share of consideration, and the Chamber advocated early settlement of the relationship of the United States to the nations of Europe, and of its policy in the maintenance of world peace and commercial intercourse. The importance of determining foreign war debts to the United States in restoring exchanges and advancing export trade was recognized, also communications abroad and American participation in the Brazilian Centennial in 1922.

Transportation was gone into in two group meetings, one dealing with railroads and the other with shipping. The Chamber reiterated its opposition to government ownership or operation of railroads and the belief that regulation should not cripple initiative nor prevent prompt action by those responsible for results. Safe and adequate rail transportation, at the lowest rates consistent with fair wages to employes, and with just returns to the owners sufficient to insure constant growth and improvement in facilities, is essential, but rates and the relation of rates between various commodities should be established with great care.

The development of waterways by the Government for navigation and the generation of electric power was advocated, also the extension of improved highways under restrictions which will permit Federal aid only for roads which will be reasonably enduring, part of an interstate system and adequately maintained.

The Government's fiscal policy and reorganization of its activities was discussed by the finance group. The Chamber urged a national budget with legislation placing upon the President the responsibility for initiating the program of expenditures and revenues which is placed before Congress. Reorganization and coordination of departments and bureaus in the interests of greater efficiency and economy was advocated in the belief that the savings effected will warrant merited salary increases and new services urgently needed, notably obtaining and preparing for American business basic world-wide data on commerce and industry.

The Chamber deplored any tardiness in generous treatment for veterans of the world war who were disabled or became sick in consequence of their service, and for widows and orphans of those who lost their lives in service. It favors forms of assistance which will enable ex-service men to cultivate the soil, build homes, or obtain vocational education, rather than a cash bonus, and advocates consolidation in one department of all government agencies concerned.

Other matters considered by various groups were government relation to national resources, notably coal, oil and timber; domestic distribution; insurance; education; and a celebration of the one hundred fiftieth anniversary of the Declaration of Independence at Philadelphia, Pennsylvania, in 1926.

TREASURY DECISIONS

No. 38689—GUMS.—Rubber Association of America *et al.* vs. United States (No. 2035); United States vs. Amsinck & Co. (No. 2038); United States vs. Rubber Association of America (No. 2039); United States vs. Rubber Association of America *et al.* (No. 2040); Rubber Association of America *et al.* vs. United States (No. 2042); Capen's Sons vs. United States (No. 2043); United States vs. Amsinck & Co. (No. 2049).

CAUCHILLO GUM is not practically usable in the manufacture of chewing gum or as a substitute for chicle, and therefore not dutiable under paragraphs 477, 552, 36, 386, Tariff Act of 1913. Importers claimed free entry under either paragraph 477 or 552 of the Act with an alternate claim that if dutiable it is under the provisions of paragraph 385. The Government contended that all the merchandise is dutiable at 15 cents a pound as crude chicle under paragraphs 36 and 386. Under paragraph 385 of the Tariff Act of 1913, the Board of General Appraisers held the merchandise dutiable at 10 per cent ad valorem as raw or unmanufactured articles not enumerated in paragraph 385.

No. 44209.—Protests 935232, etc., of A. M. Capen's Sons, New York.

GUMS: CHICLE.—It is claimed here that certain gums are dutiable as non-enumerated unmanufactured articles at 10 per cent ad valorem under paragraph 385, Tariff Act of 1913.

Opinion by HAY, G. A.: Upon stipulation of counsel that the gums in question are similar to those passed on in G. A. 8334 (T. D. 38382), they were held dutiable under paragraph 385 as claimed.—*Treasury Decisions*, Volume 39, No. 19, page 11.

WHALE INFLATION HOSE

Special rubber hose plays an indispensable rôle in modern whale hunting. Whale oil is important in the making of costly toilet soaps, lard substitutes, salves, etc., and whalebone is utilized in making buttons, combs, brush backs, umbrella handles, and numerous novelties. The modern methods adopted in whale hunting and in the conversion of the products have built up again a great industry, which at one time had almost ceased to exist.

A "BALLOONED" WHALE

Two of the largest and best equipped whaling plants in the world are located on the coast of California, one at Moss Landing, in Monterey County, and the other at Trinidad, in Humboldt County; and there are several others doing well on the Pacific coast.

Seaplanes are used to scout for whales, and when one is "spotted" a signal is given to men on powerful craft built much like submarine chasers, and on the bows of which are mounted harpoon guns resembling pieces of naval artillery. On the head of each harpoon is a time bomb which explodes within the whale; and fastened to the shank of the harpoon is a heavy chain attached to a half mile of heavy rope, the other end of which is fastened to a steam winch on the boat.

As nearly all whales when killed sink at once if not well secured, a way has been devised to keep the dead whales afloat by inflating them with air pumped into their bodies by means of a high-pressure rubber air-hose terminating in a hollow lance. When the body has been ballooned, which takes but a few moments, the air lance is withdrawn and in the opening made by it a bunch of oakum is thrust, effectively sealing the air hole. Such inflation makes it possible to bring in three and four whales as easily as so many light barges, instead of being so much dead weight in tow as in former days.

We offer the rubber trade, not only the facilities of a modern machine shop equipped with the latest improved machinery for the production of "Quality" cores and molds, special rubber machinery, cut gears of every description, mechanical rubber molds, but the services of an engineering force who have had years of training in the "heart of the rubber industry."

Our designing Engineers are thoroughly qualified to design and build a complete line of Cores and Molds for Fabric and Cord Tire. This service should appeal to the rubber mills, and we will be pleased to refer to concerns with whom we are doing business.

For years we have had among our regular customers the Goodrich, Goodyear, Firestone, Miller, Swinehart, in fact all of the rubber concerns in Akron as well as the U. S. Steel Corp., Dominion Sheet Metal Corp., Canada, and other corporations.

Send us your inquiries or arrange for a personal interview at our factory.

THE AKRON GEAR & ENGINEERING CO.
COR. SOUTH AND HIGH STS.
AKRON, OHIO, U.S.A.

News of the American Rubber Industry

FINANCIAL NOTES

THE gross earnings of the Westinghouse Electric and Manufacturing Co., East Pittsburgh, Pennsylvania, from sales billed for the year ended March 31, 1921, were $150,980,000, which is an increase of $15,000,000 over the gross earnings of the previous year. The manufacturing and selling cost was $138,774,000, and the net income available for dividends was $12,618,000, or 16.8 per cent on the company's capital stock. Dividends at the rate of 8 per cent per annum were paid during the year on both the preferred and common stock. Property and plant account shows an increase over the previous year of $9,361,000. The amount of unfilled orders on hand April 1, 1921, was $65,621,000.

A syndicate of bankers composed of Goldman, Sachs & Co., H. P. Goldschmidt & Co., Lehman Bros. and Halsey, Stuart & Co. has offered an issue of $10,000,000 ten-year 8 per cent. sinking fund gold notes of the Kelly-Springfield Tire Co. at 99½ and interest. The notes are a direct obligation of the corporation, constitute its only funded debt, and the proceeds will be used for the funding of its floating indebtedness and to furnish additional capital.

On May 16, the plan and agreement of readjustment of debt and capitalization of The Goodyear Tire & Rubber Co., dated February 1, 1921, was declared operative, and pursuant thereto the company has created and sold the first mortgage bonds, debentures and prior preference stock, as contemplated by the plan, and has been reorganized under the Ohio No Par Value Law. The committees under the plan have caused the preferred stock and common stock represented by them to be transferred to the voting trustees under a preferred stock voting trust agreement under which E. G. Wilmer, A. H. Scoville and W. A. Phillips are voting trustees and the Union Trust Co., of Cleveland, Ohio, is depositary, and under a common stockholders' voting trust agreement under which Fred S. Borton, C. R. Erwin, E. E. Mack, Russel L. Robinson and F. A. Seiberling are voting trustees and The Union Trust Co., of Cleveland, Ohio, is depositary.

DIVIDENDS DECLARED

The B. F. Goodrich Co., Akron, Ohio, has declared its quarterly dividend of one and three-quarters per cent, payable July 1 on preferred stock of record June 21, 1921.

The Fisk Rubber Co., Chicopee Falls, Massachusetts, has declared its quarterly dividend of one and three-quarters per cent on second preferred stock of record June 1, payable June 15, 1921.

The Lee Rubber & Tire Corporation, Conshohocken, Pennsylvania, has declared a quarterly dividend of fifty cents per share, payable June 1 on common stock of record May 16, 1921.

The New Jersey Zinc Co., Inc., New York, has declared its quarterly dividend of two per cent, payable August 10 on common stock of record July 30, 1921.

NEW YORK STOCK EXCHANGE QUOTATIONS

MAY 23, 1921

	High	Low	Last
Ajax Rubber Co., Inc.	31½	31½	31½
The Fisk Rubber Co.	15¾	15¼	15¼
The B. F. Goodrich Co.	37½	36⅝	37⅛
The B. F. Goodrich Co., pfd.	....	....	....
Kelly-Springfield Tire Co.	45½	43½	43⅝
Kelly-Springfield Tire Co., pfd.	....	....	....
Keystone T. & R. Co., Inc., The	....	....	....
Lee R. & T. Corporation	26¼	26¼	26¼
United States Rubber Co.	72⅝	71⅛	72¼
United States Rubber Co., 1st pfd.	....	....	....

AKRON RUBBER STOCK QUOTATIONS

The following are closing quotations of May 20, supplied by Otis & Co., Cleveland, Ohio:

	Bid	Asked
Firestone T. & R. Co., com.	70½	74
Firestone T. & R. Co., 6% pfd.	..	88
Firestone T. & R. Co., 7% pfd.	..	80
General T. & R. Co., The, com.	..	..
General T. & R. Co., The, 7% pfd.	75	85
Goodyear T. & R. Co., The com.	9⅝	10
Goodyear T. & R. Co., The, 7% pfd.	28	29¼
McGraw T. & R. Co., The	..	5
McGraw T. & R. Co., The	7½	12
Mason T. & R. Co., The, com.	15	18
Mason T. & R. Co., The, 7% pfd.	55	60
Marathon T. & R. Co., com.	3	4
Miller Rubber Co., The, com.	..	70
Miller Rubber Co., The, 8% pfd.	68	70
Portage Rubber Co., The, com.	17	18
Portage Rubber Co., The, 7% pfd.	33	35
Victor Rubber Co., The	16	20

NEW INCORPORATIONS

Allied Golf Co., March 23 (Illinois), $100,000. A. J. Musselman, president; C. L. West, vice-president; J. S. White, secretary and treasurer. Principal office, 804 Washington Boulevard, Chicago, Illinois. To manufacture and sell golf equipment.

Allbestos Corporation, April 6 (Pennsylvania), $250,000. W. G. Kitchen, president and treasurer; J. F. Bolger, vice-president and general manager; and J. S. Barr, assistant treasurer. Principal office, Philadelphia, Pennsylvania. To manufacture asbestos yarns for insulating electrical apparatus, etc.

Ambassador Tire Corporation, April 28 (New York), $30,000. M. Mayer, 9 West 91st street; J. S. Heimann and S. M. Heimann, both of 51 East 96th street—both in New York, N. Y. To manufacture tires, etc.

Beaver Rubber Manufacturing Co., Inc., April 25 (New York), $250,000. F. L. Minnigerode, C. M. Coryell and R. Czajkowski—all of 30 Church street, New York, N. Y. To manufacture mechanical rubber goods.

Chalfin Crude Rubber Corporation, April 30 (New York), $2,000. C. Brinn, I. C. Maxwell and S. E. Alpert—all of 35 Nassau street, New York, N. Y.

Congress Rubber Products, Inc., April 26 (New York), $1,000. G. A. Malla, 8729—119th street, and C. Schaembs, 10414—89th avenue, both in Richmond Hill; and J. O'Brien, 834 Park Place, Brooklyn—both in New York. Rubber goods and novelties.

Converse Tire Co., April 28 (Massachusetts), $100,000. M. M. Converse and H. Bullock, both in Andover, and H. Endicott, Weston—both in Massachusetts. Principal office, Malden, Massachusetts. To manufacture and deal in tires and accessories, rubber goods and crude rubber.

Eureka Rubber Preserving Co., March 11 (West Virginia), $400,000. H. H. Wightman, Hinton, and H. E. Haskell and A. E. Kelly, both in Huntington—both in West Virginia. Principal office, Huntington, West Virginia. To manufacture and sell rubber inner tubes.

Framingham Iron & Metal Co., April 15 (Massachusetts), $50,000. L. D. Covich, 7 Esmond street, Dorchester; S. Bean, 52 Waverley street, Framingham—both in Massachusetts; and M. Siben, 127 Hester street, New York, N. Y. Principal office, Framingham, Massachusetts. To buy and deal in rubber, metals and waste materials.

Gleasonite Co., April 21 (Massachusetts), $75,000. M. Brown and L. Brown—both of 11 Gibbs street, Brookline, and F. J. Gleason, 22 Prescott street, Cambridge—both in Massachusetts. Principal office, Boston, Massachusetts. To buy and deal in rubber and machinery.

Holyoke Cord Tire Co., Inc., May 2 (New York), $2,000. J. S. Bernstein, 233 Broadway, and S. R. and C. S. Huntley, both of 41 East 47th street—both in New York, N. Y. To manufacture cord tires.

Insulite Co., March 7 (West Virginia), $50,000. A. G. Strickler, G. W. Moore and C. B. Morris—all of Ellenboro, West Virginia. Principal office, Ellensboro, West Virginia. To manufacture, buy and sell hard rubber substitutes for electrical insulations, etc.

Larkide Co., The, April 14 (Massachusetts), $75,000. H. V. Tillson, 23 Mellen street, Cambridge; Charles E. Fay, 46 Rossmore Road, Jamaica Plain; and David J. Donahue, 46 Huntington avenue, Boston—all of Massachusetts. Principal office, Boston, Massachusetts. To buy, sell, deal in and manufacture cottons, rubbers, rubber substitutes, chemicals, dyes, etc.

Le Boeuf Fountain Pen Co., Inc., April 20 (Massachusetts), $100,000. F. Le Boeuf, 51 Arch street; E. E. Le Boeuf, 755 White street; L. J. Learned, and J. H. Williams—both in Round Hill; and E. Le Boeuf—all in Springfield, Massachusetts. Principal office, Springfield, Massachusetts. To manufacture fountain pens.

Liberty Druggists' Sundries Co., April 30 (Delaware), $25,000. Incorporator, Corporation Guarantee & Trust Co., 323 Land Title Building, Philadelphia, Pennsylvania; attorney, M. D. Canter, 597 Union Arcade, Pittsburgh, Pennsylvania.

Lincoln Vulcanizing Co., Inc., May 19 (New York), $5,000. D. Klein, 963 Kelly street, Bronx; R. Thalwitzer, and T. Reinhardt, both of 218 Elbertson street, Elmhurst—both in New York. Tire repairs.

McDonald-Harker Co., The, January 28 (Iowa), $25,000. C. F. McDonald, president, Marinette, Wisconsin; D. A. McDonald, secretary and treasurer, and G. W. Harker, vice-president—both of Des Moines, Iowa. Principal office, 1206 Grand avenue, Des Moines, Iowa. To sell pneumatic and solid tires and cushion wheels, do vulcanizing and automobile repairing, etc.

Merrit Rubber Co., Inc., May 16 (New York), $10,000. J. H. Horne, 123 Chester avenue, Brooklyn, and S. M. Post, 414 East 4th street, New York—both in New York; and M. J. Kates, 1258 East 2nd street, Plainfield, New Jersey.

National Tire Stores, Inc., April 25 (Delaware), $1,000,000. Incorporators, A. E. Manheimer, T. J. Kelly and P. Zack—all of Chicago, Illinois; attorney, Corporation Maintenance & Service Co. To manufacture tire tubes.

Pacific Rubber Ace Co., April 13 (California), $250,000. Directors: F. J. Bole, C. Ploeser, B. W. Cunningham, B. F. Jacobs, president, and S. L. Ploeser, vice-president and general manager. Principal office, 281 I. W. Hellman Building, Los Angeles, California. To manufacture inner tire known as "Rubber Ace," and other rubber articles.

Pittsburgh Cotter Co., April 21 (Delaware), $225,000. Corporation Guarantee & Trust Co., 323 Land Title Building, Philadelphia, Pennsylvania. Principal office, 401 Standard Life Building, Fittsburgh, Pennsylvania. To manufacture tires.

Renard Rubber Co., May 2 (Delaware), $3,000,000. Incorporator, The Corporation Trust Co. of America, Du Font Building, Wilmington, Delaware; attorneys, Goldsmith & Rosenthal, 1476 Broadway, New York, N. Y. To manufacture tires.

Standard Tire Protector Co., The, April 27 (Delaware), $100,000. Incorporator, The Corporation Trust Co. of America, Du Pont Building, Wilmington, Delaware; attorneys, Smith, Olds & Smith, Marshall Building, Cleveland, Ohio. To manufacture tires and protectors.

Tracey-Russell Tire Corporation, May 2 (New York), $15,000. W. H. Tracey, Kirk Hotel, and N. C. Russell, 1610 Lodi street—both of Syracuse; and J. W. Brennan, Geneva—both in New York. Principal office, Syracuse, New York. To repair tires.

TIRE PRICE REDUCTIONS

The B. F. Goodrich Co., Akron, Ohio, has announced a 20 per cent flat decrease in prices of cord and fabric pneumatic tires.

The United States Rubber Co., New York, N. Y., has reduced prices on "Royal" cord tires, all chain and "Nobby" tread tires 17½ per cent, "Usco" fabric tires and red and gray tubes.

The Firestone Tire & Rubber Co., Akron, Ohio, has made tire price reductions as follows: cord tires 20 per cent, fabric tires 17 per cent and tubes 20 per cent.

The Miller Rubber Co., Akron, Ohio, announces a 17½ per cent reduction on fabric tires, 12½ per cent on cord tires and 20 per cent on all tubes.

The Goodyear Tire & Rubber Co., Akron, Ohio, cut prices 12 per cent on cord tires; 15 per cent on the general run of fabrics and 15.8 per cent on some fabric sizes. Tubes were reduced 20 per cent.

The Fisk Rubber Co., Chicopee Falls, Massachusetts has reduced prices from 12½ to 20 per cent.

The Thermoid Rubber Co., Trenton, New Jersey, made a 28 per cent cut on all Ford size tires; 23 per cent on 4½-inch sizes, and 20 per cent on all other sizes.

The Mason Tire & Rubber Co., Kent, Ohio, reduced the prices of heavy duty cord tires 20 per cent and other prices in proportion.

The Parker Tire & Rubber Co., Indianapolis, Indiana, advises that its new price list shows a discount of approximately 20 per cent.

The Inland Rubber Co., Chicago, Illinois, is now offering 30 by 3½ fabric tires at $18 and cord at $26.50. Tubes are being offered at $2.55 for gray and $3.10 for red.

The Lee Rubber & Tire Corporation, Conshohocken, Pennsylvania, announces the following reductions: fabric and cord tires, 20 per cent; fabric puncture-proof tires 20 per cent; and puncture-proof cord tires about 17 per cent.

A 20 per cent reduction is made on all pneumatic tires with the exception of Ford sizes, which are cut 22 per cent, by the Kelly-Springfield Tire Co., New York, N. Y. Tubes are reduced 30 per cent.

The Pennsylvania Rubber Co., Jeannette, Pennsylvania, has made an approximate 20 per cent reduction on all tires.

The Michelin Tire Co., Milltown, New Jersey, has reduced the price of their 30 by 3½ soft bead clincher fabric tire 15½ per cent.

The Hewitt Rubber Co., Buffalo, New York, announces reduction on casings from 20 to 22½ per cent and on tubes 20 per cent.

The Denman-Myers Cord Tire Co., Cleveland, Ohio, has made a 17½ per cent reduction on 30 by 3½ non-skid clincher tires and 12½ per cent on all larger sizes.

PRESIDENT, KELLY-SPRINGFIELD TIRE CO.

ALFRED B. JONES, the newly elected president of the Kelly-Springfield Tire Co., New York City, brings to his new position a varied and interesting experience that fits him well for its duties and responsibilities.

Born at Mt. Holly, New Jersey, in 1874, he was graduated from Princeton University in 1896 and entered the service of the Pennsylvania Railroad Co., where he worked up from rodman to divisional superintendent. In 1902, he went to Akron, Ohio, as division engineer of the Cleveland, Akron and Columbus Railway, which position he held until his resignation in 1908 to accept the superintendency of the Kenmore plant of the Diamond Rubber Co.

A. B. JONES

When the Diamond company was consolidated with The B. F. Goodrich Co., Mr. Jones was made assistant to the manager of the works and later, director of plant administration. In the latter part of 1917 he was made a member of the Akron Board of Health, and in March, 1918, was elected second vice-president of The B. F. Goodrich Co. For seven months of 1918 he was in the service of the American Red Cross overseas as deputy commissioner for France, his work being that of director of transportation and distribution of supplies.

In 1920 he was again elected vice-president of The B. F. Goodrich Co., which position he resigned in February, 1921, to accept the presidency of the Kelly-Springfield Tire Co.

Mr. Jones is a member of the arbitration committee of The Rubber Association of America, Inc., and of the advisory board of the Ohio Transportation Association. His clubs include the Portage Country Club, Akron University Club, Akron City Club and the Princeton Club of New York City.

FRISWELL NOW RUBBER FACTORY CONSULTANT

Arthur E. Friswell, well-known in the United States and England as a rubber expert, has established himself in Jersey City, New Jersey, as rubber factory consultant, giving practical assistance in all problems relating to rubber goods, specializing in tires and mechanical goods.

A PROMINENT COLOR MANUFACTURER

EDWARD MOLINEUX WALDO, senior partner of E. M. & F. Waldo, color manufacturers and importers, 11 Broadway, New York, N. Y., is a notable instance of the achievements of perseverance when attended by an aptitude for business. He was born in Brooklyn, New York, in 1884 and attended the Trinity Church School and Staten Island Academy, but left school in 1900 to begin his business career.

E. M. WALDO

His first employment was addressing envelopes for Elms & Johnson, dry goods, New York City. Later he worked as a messenger for the Western Electric Co., as office boy and then exchange clerk for Baring, Morgan & Co., New York, N. Y., bankers; and as stenographer and office assistant to the advisory committee of the United States Steel Corporation, New York, N. Y.

Selling then attracted him, and he became a salesman for J. F. Hitchcock, paper merchant, New York, N. Y. Later he went in the same capacity to the G. Siegle Co., color manufacturers, New York, N. Y., in which position he acquired the experience which enabled him to engage in business for himself and organize the firm of which he is senior partner.

Mr. Waldo has found himself too busy with the conduct of his own multiplying affairs to seek or accept office in outside organizations. He is, however, a member of the Drug and Chemical Club, Paint, Oil and Varnish Club of New York, The Rubber Association of America, Inc., New York Board of Trade and Transportation and the New York Credit Men's Association.

THE RUBBER TRADE IN THE EAST AND SOUTH

By Our Regular Correspondent

NEW YORK

CHARLES F. U. KELLY, formerly with the Pennsylvania Rubber Co., Jeannette, Pennsylvania, and the Dreadnaught Tire & Rubber Co. of Maryland, Baltimore, is now in charge of the Quaker City Rubber Co.'s tire sales division, just opened at 1664 Broadway, New York.

Greenstein & Pelz, 30 Irving Place, New York, have been appointed sole agents for the "Rubbadubdub" floating toys described in THE INDIA RUBBER WORLD, April 1, 1921, and manufactured by J. G. Franklin & Sons, Limited, 17 Colvestone Crescent, Dalston, London, E. 8, England.

R. Westaway has been designated by A. D. Julliard & Co., mill agents for cotton yarns, etc., as its representative in the state of New York, at 70 Worth street, New York.

L. A. Duffy, Inc., successor to Duffy & Sears, has removed from 133 Front street to 15 William street, New York.

The Liberty Paper Co. advises of change of address from 52 Vanderbilt avenue to 203 Lafayette street, New York.

The executive offices of the Martin Tire Corporation have moved from 130 West 52nd street to a completely remodeled building immediately in the rear of its present quarters on 51st street, New York.

W. G. Ryckman Co., Inc., rubber and other crude products, 77 Broad street, New York, has been dissolved and C. B. Kaufmann is successor.

George E. Meurs is succeeding Victor Roth as manager of the New York export branch of The Miller Rubber Co., Akron, Ohio. He will be directly responsible to C. E. Wagner, in charge of the Akron export department. Mr. Meurs' export experience covers a period of thirteen years in Latin-America and New York.

J. A. Richardson has been appointed branch manager of the Philadelphia and New York territories of the Portage Tire & Rubber Co., Akron, Ohio. He joined the company eighteen months ago as a salesman.

The Rubber Trade Association of New York, formerly at 44 Broad street, and The Rubber Trade Association of New York, Clearing Department, formerly at 150 Nassau street, are now located at Room 810, 75 Maiden Lane, New York.

A new crude rubber brokerage firm has been formed under the name Horn & Leavitt at 50 Broad street, New York. Frederick J. Horn for several years was connected with the crude rubber department of W. R. Grace & Co., in New York and Akron, and also with Fred Stern & Co., Akron. Edward W. Leavitt was originally with The B. F. Goodrich Co., Akron, and later with Fred Stern & Co., in both the Akron and New York offices.

The Automatic Tire Machine Corporation, 197 Main street, Buffalo, maker of tire-building machines, is about to start production. W. A. Schaffer is president; Elmer H. Patterson, vice-president; Howard G. E. Smith, secretary and treasurer; and W. L. Huffman, purchasing agent.

Walter E. Palmer has been appointed secretary of the New York Rubber Co., 84-86 Reade street, New York, N. Y., succeeding Henry Montgomery who has resigned. Mr. Palmer has been connected with the plant at Beacon for 21 years and his advancement comes as a well-deserved recognition of fidelity and merit. He will have charge of manufacturing.

PENNSYLVANIA

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SOUTHERN NOTES

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READ THE ARTICLE ON GLOVE REPAIRING IN THIS ISSUE.

National Tire Stores, Inc., April 25 (Delaware), $1,000,000. Incorporators, A. E. Manheimer, T. J. Kelly and P. Zack—all of Chicago, Illinois; attorney, Corporation Maintenance & Service Co. To manufacture tire tubes.

Facific Rubber Ace Co., April 13 (California), $250,000. Directors: F. J. Bole, C. Ploeser, B. W. Cunningham, B. F. Jacobs, president, and S. L. Ploeser, vice-president and general manager. Principal office, 281 I. W. Hellman Building, Los Angeles, California. To manufacture inner tire known as "Rubber Ace," and other rubber articles.

Pittsburgh Cotter Co., April 21 (Delaware), $225,000. Corporation Guarantee & Trust Co., 323 Land Title Building, Philadelphia, Pennsylvania. Principal office, 401 Standard Life Building, Fittsburgh, Pennsylvania. To manufacture tires.

Renard Rubber Co., May 2 (Delaware), $3,000,000. Incorporator, The Corporation Trust Co. of America, Du Font Building, Wilmington, Delaware; attorneys, Goldsmith & Rosenthal, 1476 Broadway, New York, N. Y. To manufacture tires.

Standard Tire Protector Co., The, April 27 (Delaware), $100,000. Incorporator, The Corporation Trust Co. of America, Du Pont Building, Wilmington, Delaware; attorneys, Smith, Olds & Smith, Marshall Building, Cleveland, Ohio. To manufacture tires and protectors.

Tracey-Russell Tire Corporation, May 2 (New York), $15,000. W. H. Tracey, Kirk Hotel, and N. C. Russell, 1610 Lodi street—both of Syracuse; and J. W. Brennan, Geneva—both in New York. Principal office, Syracuse, New York. To repair tires.

TIRE PRICE REDUCTIONS

The B. F. Goodrich Co., Akron, Ohio, has announced a 20 per cent flat decrease in prices of cord and fabric pneumatic tires.

The United States Rubber Co., New York, N. Y., has reduced prices on "Royal" cord tires, all chain and "Nobby" tread tires 17½ per cent, "Usco" fabric tires and red and gray tubes.

The Firestone Tire & Rubber Co., Akron, Ohio, has made tire price reductions as follows: cord tires 20 per cent, fabric tires 17 per cent and tubes 20 per cent.

The Miller Rubber Co., Akron, Ohio, announces a 17½ per cent reduction on fabric tires, 12½ per cent on cord tires and 20 per cent on all tubes.

The Goodyear Tire & Rubber Co., Akron, Ohio, cut prices 12 per cent on cord tires; 15 per cent on the general run of fabrics and 15.8 per cent on some fabric sizes. Tubes were reduced 20 per cent.

The Fisk Rubber Co., Chicopee Falls, Massachusetts has reduced prices from 12½ to 20 per cent.

The Thermoid Rubber Co., Trenton, New Jersey, made a 28 per cent cut on all Ford size tires; 23 per cent on 4½-inch sizes, and 20 per cent on all other sizes.

The Mason Tire & Rubber Co., Kent, Ohio, reduced the prices of heavy duty cord tires 20 per cent and other prices in proportion.

The Parker Tire & Rubber Co., Indianapolis, Indiana, advises that its new price list shows a discount of approximately 20 per cent.

The Inland Rubber Co., Chicago, Illinois, is now offering 30 by 3½ fabric tires at $18 and cord at $26.50. Tubes are being offered at $2.55 for gray and $3.10 for red.

The Lee Rubber & Tire Corporation, Conshohocken, Pennsylvania, announces the following reductions: fabric and cord tires, 20 per cent; fabric puncture-proof tires 20 per cent; and puncture-proof cord tires about 17 per cent.

A 20 per cent reduction is made on all pneumatic tires with the exception of Ford sizes, which are cut 22 per cent, by the Kelly-Springfield Tire Co., New York, N. Y. Tubes are reduced 30 per cent.

The Pennsylvania Rubber Co., Jeannette, Pennsylvania, has made an approximate 20 per cent reduction on all tires.

The Michelin Tire Co., Milltown, New Jersey, has reduced the price of their 30 by 3½ soft bead clincher fabric tire 15½ per cent.

The Hewitt Rubber Co., Buffalo, New York, announces reduction on casings from 20 to 22½ per cent and on tubes 20 per cent.

The Denman-Myers Cord Tire Co., Cleveland, Ohio, has made a 17½ per cent reduction on 30 by 3½ non-skid clincher tires and 12½ per cent on all larger sizes.

PRESIDENT, KELLY-SPRINGFIELD TIRE CO.

ALFRED B. JONES, the newly elected president of the Kelly-Springfield Tire Co., New York City, brings to his new position a varied and interesting experience that fits him well for its duties and responsibilities.

Born at Mt. Holly, New Jersey, in 1874, he was graduated from Princeton University in 1896 and entered the service of the Pennsylvania Railroad Co., where he worked up from rodman to divisional superintendent. In 1902, he went to Akron, Ohio, as division engineer of the Cleveland, Akron and Columbus Railway, which position he held until his resignation in 1908 to accept the superintendency of the Kenmore plant of the Diamond Rubber Co.

A. B. JONES

When the Diamond company was consolidated with The B. F. Goodrich Co., Mr. Jones was made assistant to the manager of the works and later, director of plant administration. In the latter part of 1917 he was made a member of the Akron Board of Health, and in March, 1918, was elected second vice-president of The B. F. Goodrich Co. For seven months of 1918 he was in the service of the American Red Cross overseas as deputy commissioner for France, his work being that of director of transportation and distribution of supplies.

In 1920 he was again elected vice-president of The B. F. Goodrich Co., which position he resigned in February, 1921, to accept the presidency of the Kelly-Springfield Tire Co.

Mr. Jones is a member of the arbitration committee of The Rubber Association of America, Inc., and of the advisory board of the Ohio Transportation Association. His clubs include the Portage Country Club, Akron University Club, Akron City Club and the Princeton Club of New York City.

FRISWELL NOW RUBBER FACTORY CONSULTANT

Arthur E. Friswell, well-known in the United States and England as a rubber expert, has established himself in Jersey City, New Jersey, as rubber factory consultant, giving practical assistance in all problems relating to rubber goods, specializing in tires and mechanical goods.

A PROMINENT COLOR MANUFACTURER

EDWARD MOLINEUX WALDO, senior partner of E. M. & F. Waldo, color manufacturers and importers, 11 Broadway, New York, N. Y., is a notable instance of the achievements of perseverance when attended by an aptitude for business. He was born in Brooklyn, New York, in 1884 and attended the Trinity Church School and Staten Island Academy, but left school in 1900 to begin his business career.

E. M. WALDO

His first employment was addressing envelopes for Elms & Johnson, dry goods, New York City. Later he worked as a messenger for the Western Electric Co., as office boy and then exchange clerk for Baring, Morgan & Co., New York, N. Y., bankers; and as stenographer and office assistant to the advisory committee of the United States Steel Corporation, New York, N. Y.

Selling then attracted him, and he became a salesman for J. F. Hitchcock, paper merchant, New York, N. Y. Later he went in the same capacity to the G. Siegle Co., color manufacturers, New York, N. Y., in which position he acquired the experience which enabled him to engage in business for himself and organize the firm of which he is senior partner.

Mr. Waldo has found himself too busy with the conduct of his own multiplying affairs to seek or accept office in outside organizations. He is, however, a member of the Drug and Chemical Club, Paint, Oil and Varnish Club of New York, The Rubber Association of America, Inc., New York Board of Trade and Transportation and the New York Credit Men's Association.

THE RUBBER TRADE IN THE EAST AND SOUTH

By Our Regular Correspondent

NEW YORK

CHARLES F. U. KELLY, formerly with the Pennsylvania Rubber Co., Jeannette, Pennsylvania, and the Dreadnaught Tire & Rubber Co. of Maryland, Baltimore, is now in charge of the Quaker City Rubber Co.'s tire sales division, just opened at 1664 Broadway, New York.

Greenstein & Pelz, 30 Irving Place, New York, have been appointed sole agents for the "Rubbadubdub" floating toys described in THE INDIA RUBBER WORLD, April 1, 1921, and manufactured by J. G. Franklin & Sons, Limited, 17 Colvestone Crescent, Dalston, London, E. 8, England.

R. Westaway has been designated by A. D. Julliard & Co., mill agents for cotton yarns, etc., as its representative in the state of New York, at 70 Worth street, New York.

L. A. Duffy, Inc., successor to Duffy & Sears, has removed from 133 Front street to 15 William street, New York.

The Liberty Paper Co. advises of change of address from 52 Vanderbilt avenue to 203 Lafayette street, New York.

The executive offices of the Martin Tire Corporation have moved from 130 West 52nd street to a completely remodeled building immediately in the rear of its present quarters on 51st street, New York.

W. G. Ryckman Co., Inc., rubber and other crude products, 77 Broad street, New York, has been dissolved and C. B. Kaufmann is successor.

George E. Meurs is succeeding Victor Roth as manager of the New York export branch of The Miller Rubber Co., Akron, Ohio. He will be directly responsible to C. E. Wagner, in charge of the Akron export department. Mr. Meurs' export experience covers a period of thirteen years in Latin-America and New York.

J. A. Richardson has been appointed branch manager of the Philadelphia and New York territories of the Portage Tire & Rubber Co., Akron, Ohio. He joined the company eighteen months ago as a salesman.

The Rubber Trade Association of New York, formerly at 44 Broad street, and The Rubber Trade Association of New York, Clearing Department, formerly at 150 Nassau street, are now located at Room 810, 75 Maiden Lane, New York.

A new crude rubber brokerage firm has been formed under the name Horn & Leavitt at 50 Broad street, New York. Frederick J. Horn for several years was connected with the crude rubber department of W. R. Grace & Co., in New York and Akron, and also with Fred Stern & Co., Akron. Edward W. Leavitt was originally with The B. F. Goodrich Co., Akron, and later with Fred Stern & Co., in both the Akron and New York offices.

The Automatic Tire Machine Corporation, 197 Main street, Buffalo, maker of tire-building machines, is about to start production. W. A. Schaffer is president; Elmer H. Patterson, vice-president; Howard G. E. Smith, secretary and treasurer; and W. L. Huffman, purchasing agent.

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THE RUBBER TRADE IN NEW JERSEY

By Our Regular Correspondent

TRENTON NOTES

All tire and tube manufacturers in Trenton have placed in effect a reduction on all tire products that varies at different plants and runs from 17 to 25 per cent, according to the grade of tires made.

The Thermoid Rubber Co. announces a reduction of 16 to 28 per cent, the former applying to cord and the latter to fabric tires. This places Trenton-made tires and tubes on a pre-war basis and will eventually result in increased business at the factories.

At the office of the United & Globe Rubber Co. it was said that the reduction in the prices of tires was made after the cut put into effect by the larger companies in the West and elsewhere. Summed up, the reduction in Trenton averages about 20 per cent. The reduction became effective the first week in May.

The entire situation has taken on a peculiar turn. The industry began to improve after the big slump of last winter and prospects were excellent for a big summer trade, when business began to drop off in certain sections of the country. All it needs is stormy weather to hurt the tire industry. While orders were coming in for many tires there was a long and severe storm in the West which had a telling effect upon the tire industry. Tire salesmen covering the territory along the Atlantic Seaboard, however, report business good.

The Thermoid Rubber Co. announces that orders have dropped off during the past few weeks, and the cause was undoubtedly the western storms. It is expected that business will pick up again shortly. About 350 men are at work. The Zee Zee Rubber Co. reports a revival in business and is now placing more men at work. The company's salesmen announce an increase in orders from all sections. The Bergougnan Rubber Corporation is now running 75 per cent capacity. Warren A. Clapp, treasurer of the company, says that the concern has experienced a steady improvement during the past few weeks. At the plant of the Empire Rubber & Tire Corporation business is picking up and a busy summer is anticipated.

The Ajax Rubber Co. is looking far ahead and making plans for anticipated revival in business. Operations have been curtailed to permit the installation of new machinery and improved equipment. Present plans contemplate a renewal of activities on a larger scale within a few weeks. The Essex Rubber Co. is operating on a full basis, while the Whitehead Brothers' Rubber Co. is operating but three days a week. Some of the departments of the Vulcanized Rubber Co. are working on part time only, with others on full time.

John S. Broughton, president of the United & Globe Rubber Co., has received a contract for 38,000 feet of fire hose for the Fire Department of the City of Philadelphia. The hose department of the company is now running at 100 per cent capacity.

One of the busiest rubber concerns in the East is the Acme Rubber Manufacturing Co., whose plant is running full time, fifty-five hours per week, in addition to a night force working fifty hours per week. This is the only concern in Trenton operating on full time and with a night crew. Business at the plant has increased to such an extent that the company recently completed a one-story addition, 90 by 300 feet, devoted exclusively to the manufacture of molded hose.

F. T. Austin and K. A. Ward have opened a tire establishment at 402 Market street, Camden, New Jersey, to equip automobiles in emergency cases, to aid motorists who have tire trouble along the road and who do not want to take the trouble to repair their tires. Mr. Austin has been engaged in the tire business for many years, and Mr. Ward was formerly supervisor of branches of the Ajax Rubber Co.

Owing to increased business the Trenton Zinc & Chemical Co., manufacturers of zinc oxide, will shortly erect additions to the plant at Trenton. The company last year produced 2,000,000 pounds of zinc oxide and contemplates turning out 12,000,000 pounds when the plant is enlarged. It has contracts for the output of the mines in Salem, Kentucky, and is operating 100 per cent capacity.

John O. Bigelow, trustee in bankruptcy for the Trenton Rubber Co., manufacturer of automobile tires, has filed an intermediate report in the United States District Court, showing that the company has earned profits of $6,545.32 by a partial operation of the plant. Judge Lynch has confirmed the report of the trustee.

The Times Square Auto Supply Co., with headquarters in Chicago, Illinois, has taken over the business of the Automotive Accessories Co., 128 East Hanover street, Trenton. The company has made a number of improvements to the store and has added bicycle tires to the tire department.

William H. Johnson & Son, who have been conducting a tire vulcanizing establishment at Broad Street Park, Trenton, have opened a business at 407 South Broad street.

Charles H. West has removed his tire establishment from 135 East Hanover street to larger quarters at 116 South Montgomery street, Trenton, where he is handling Bergougnan tires and tubes.

MISCELLANEOUS NEW JERSEY NOTES

The tire business of A. H. Brown & Sons, Red Bank, New Jersey, has been purchased by George H. Brush, Inc., tire dealer, of 30 Central avenue, Newark. The Brown concern is the oldest tire company in Red Bank.

George F. Armstrong, president of The Armstrong Rubber Co., Inc., Garfield, New Jersey, and New York, New York, states that the factory is running on a twenty-four hour basis, at maximum capacity, and that the increased labor efficiency and reasonable attitude of rubber workers will be great factors in meeting the demand for tires and tubes during the coming season.

AMERICAN SOCIETY FOR TESTING MATERIALS

The provisional program has been issued for the twenty-fourth annual meeting of the American Society for Testing Materials to be held at Asbury Park, New Jersey, June 20 to 24, 1921. Among the reports to be presented at this meeting, of special interest to rubber manufacturers, are those by Committee D-11 on Rubber Products, and by Committee D-13 on Textiles.

THE RUBBER TRADE IN RHODE ISLAND

By Our Regular Correspondent

While the National India Rubber Co. at Bristol and the Alice Mill of the Woonsocket Rubber Co. at Woonsocket, resumed operations May 9 on a limited and curtailed schedule, there is comparatively little change in the industrial situation among the manufacturing rubber plants of Rhode Island from what there was a month ago. A general spirit of caution and conservatism is apparent and with few orders coming to book there is a decided uncertainty as to how long even the limited schedule now in force may continue.

At the plant of the Davol Rubber Co. there is considerable more regularity from the fact that its staple lines are in general demand at all seasons of the year, especially its druggists' and medicinal supplies. The large five-story brick building that forms a portion of the Davol estate has been entirely vacated by former tenants in various lines of manufacturing business, and the entire building is being altered and prepared for purposes of the Davol company. It is understood that among the first departments that will be removed thereto will be the storage and shipping sections, which will afford greatly increased facilities at the factory plant for manufacturing purposes. The building is at the southwest corner of Point and Richmond streets, almost opposite the Point street frontage of the factory plant, and

contains a total floor space nearly equal to that of the factory proper.

The tire departments of the Revere Rubber Co. at Eagle street, Providence, are quiet, but in the other departments, especially in the commercial sections, there is a moderate activity that will probably continue for some months to come. There is no rush demand but a consistent run of regular orders.

On the same date that the National plant at Bristol began operations, the Alice Mill of the Woonsocket Rubber Co. resumed operations after being idle since February 19. The calender room reopened on May 9, and the other rooms followed in regular sequence so that by the end of the week the entire plant was in operation. The plant is to run on reduced production with only 60 to 70 per cent of the normal output. The Millville plant of the same company, which has been closed since last December, however, will remain closed.

The plant of the Mount Hope Spinning Co., at Warren, producing tire yarn, was opened Monday morning, May 16, and about 250 are now being employed there. This number is to be increased until the plant, both the old and the new mills, is running to capacity. There were more than 300 persons at the plant looking for work when operations were resumed, but preference was given to the former employes and the necessary number taken on to make up the desired number for starting. The plant, which was closed last September, after doing a rushing business since before the war, has been running only a few hands on small orders for several months. The new addition to the plant, which was erected when business was booming, but which was not used because of the sudden slump in business, is now to be put into operation. During the period when the mill was practically at a standstill the machinery of the entire plant was rearranged so that now there is a perfect continuity of operations from the raw cotton as it enters one end of the mill until it emerges, after a continuous performance from one machine to another, the finished product—tire yarn.

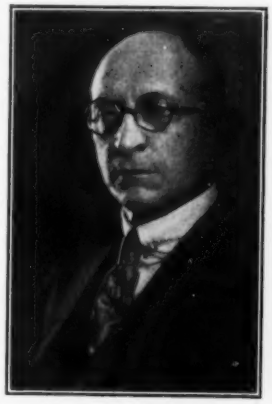
The United States Finishing Co., whose plants include the Silver Spring Bleachery and the Queen Dyeing Works in Providence and the big Dunnell works at Pawtucket, shows $10,600,000 gross, but only $172,059 net profits for the year ended December 31, 1920, according to the statement that was made public a few days ago. This net (after all charges and taxes) is equal on the $3,600,000 preferred stock, to $4.77 a share. Full seven per cent dividends on preferred, amounting to $252,000, were paid during the year; likewise three quarterly dividends of 1¾ per cent each on common stock, amounting to $143,937. Detailed income account for the year ended December 31, 1920, follows (no comparison with previous calendar year being possible): gross income, $10,616,128; cost of operation, $10,278,813; net, $337,315; other income, $144,939; general taxes, $143,858; bond interest, $99,142; loss on Liberty bonds, $57,637; Federal income tax of 1920, $9,558; net profit, $172,059. Balance sheet as of December 31, 1920, shows quick assets of $1,871,234 and quick liabilities of $313,596, leaving net working capital $1,557,638.

Francis Sage, of Hastings, Michigan, has been selected by the officials of the United States Rubber Co. to succeed M. I. Bowes as superintendent of the Lawrence Felting Co. at Millville and began his new duties early in the past month, Mr. Bowes' resignation taking effect May 1. Mr. Sage has been with the United States Rubber Co. for many years, and in charge of the Hastings Wool Boot Co. for the last several years in the capacity of factory manager. He will continue to serve in that capacity besides taking over the management of the Millville plant.

DON'T THROW AWAY YOUR VALVE CAPS. SCREW THEM ON FIRMLY and prevent air leakage here. The valve plunger, a little mechanism inside the stem, serves as an air lock during inflation, but the valve cap is the secondary air seal during usage. Tire men advise using the valve to inflate the tire and using the cap to keep it inflated.—*Miller News Service.*

MECHANICAL RUBBER GOODS MANUFACTURER

THOMAS G. RICHARDS, a native of Boston, Massachusetts, was educated in the Boston public schools and at the Massachusetts Institute of Technology, from which school he was graduated in 1894. Immediately following this, Mr. Richards began his rubber manufacturing career in the engineering department of the Boston Woven Hose & Rubber Co., Cambridge, Massachusetts. He was chief of this department for two years in charge of plant development, and later he held both the positions of purchasing agent and assistant superintendent for a year, respectively. The essential element controlling his rapid advancement was conspicuous ability, which gained him the post of factory manager in 1899. His selection by the company management was amply justified by his record as a competent executive and plant engineer.



THOMAS G. RICHARDS

In 1906, jointly with Charles Beebe, then of the Boston Woven Hose & Rubber Co., Mr. Richards organized the B. & R. Rubber Co., North Brookfield, Massachusetts. Some years later he reorganized this concern as the Quabaug Rubber Co. He served both of these companies a combined period of fourteen years as president and manager, resigning in November, 1920.

Competition in the mechanical rubber goods manufactured at North Brookfield led Mr. Richards to specialize in factory costing and compounding and to develop an original system of factory operation for maintaining production at the rated maximum. His club connections are with the M. I. T. Chapter Delta Upsilon and the Engineers' Club of Boston, Massachusetts.

THE RUBBER TRADE IN MASSACHUSETTS

By Our Regular Correspondent

FOLLOWING the reduction of 20 per cent in Goodrich tire prices on May 2, many other tire manufacturers throughout the country have readjusted their price schedules as a stimulant to larger retail sales, better stocking by dealers and increased production. These revisions bring tire costs to the consumer during the biggest buying months of the year down to or below the pre-war level as represented by the 1913 schedules. It practically means that a car owner may now buy five tires for the former price of four, or get his spare tire free of charge. Taking into consideration the fact that tires today give from 50 to 100 per cent greater mileage than they did eight years ago, the conclusion is obvious that, based on comparative service, they cost less than ever before.

Massachusetts tire manufacturers have for the most part responded to the downward trend in prices, but in certain instances their former price-lists were such that a 20 per cent reduction was unnecessary to bring schedules down to approximately the pre-war level for the class of goods being produced. Factory reports generally indicate a marked rise in the production curve to keep warehouse stocks ample since the new prices became effective.

Grow cord and fabric tires have been reduced 10 per cent, Fisk cord and fabric tires from 12½ to 20 per cent. Converse tire price reductions average 22 per cent on fabric tires, 15 per cent on cords and 20 per cent on tubes. Hood prices have been dropped 15 per cent on cord tires, 12½ per cent on fabric tires

and 20 per cent on tubes. New England cords have been reduced about 17 per cent, and Revere tires, 11½ per cent on cords, 15 to 17½ per cent on fabric tires and 20 per cent on tubes. Tyrian consumer's prices on fabric tires are reduced 20 per cent, cord tires 15 per cent and inner tubes 20 per cent.

MISCELLANEOUS MASSACHUSETTS NOTES

Evidence of marked improvement in the tire trade situation is shown by the resumption of work at the full capacity of three shifts on May 9 in the tire and tube plants of the Hood Rubber Co., Watertown, Massachusetts. Orders are sufficient to warrant maximum production for the remainder of the year, including a large quota for the new Ford size Hood tire, known as the "Yellow Arrow."

The rubber reclaimers of Massachusetts report that business conditions are considerably improved over the last quarter of 1920 and the early part of this year. They are optimistic about the future, although they do not look for boom business such as was ruling during the early part of 1920.

The work of reconstructing the reclaiming plant of the Monatiquot Rubber Works Co., South Braintree, Massachusetts, following the fire which in February destroyed five of the nine buildings of the plant, is about sixty per cent completed and the works will soon be restored to former capacity. Meanwhile there has been scarcely any interruption in the supply of the company's well-known reclaims to meet the needs of its many patrons.

The Needham Tire Co., Charles River Village, Massachusetts, which discontinued its tire business about a year ago, is now engaged in the manufacture of rubber heels and soles. Phil C. Stingel is president and general manager of the company.

Orders for rubber footwear are not being received by manufacturers in such volume or so early as in past years, indicating that retailers' stocks are considerable and will in most instances be replenished for the autumn trade as needed. There appears to be a marked tendency for retailers to reduce their inventories considerably, depending upon manufacturers to carry their stocks. Business in rubber-soled canvas footwear continues to be very gratifying. The Converse Rubber Shoe Co., Malden, Massachusetts, is still running a large daily ticket and finding a ready market for the product.

The Fells factory of the Boston Rubber Shoe Co., Malden, Massachusetts, will be shut down from May 27 until July 5.

BOSTON NOTES

The Pettingell-Andrews Co., 100 Brookline avenue, Boston, has been appointed New England distributer for Yale tires and tubes manufactured by the Yale Tire & Rubber Co., New Haven, Connecticut.

"Better Selling Methods" was the subject of a talk by John E. Magaw, of the Hood Rubber Products Co., Watertown, at a recent meeting of the New England Shoe Wholesalers' Association in Boston. From a carefully prepared chart of comparative quotas, sales and possibilities, as of July 1, 1920, he proved that the rubber shoe industry has not tried out intensive sales methods to the extent that the volume of the business justifies.

The Arco Tire Co., Inc., 27 School street, Boston, is the sole New England distributer for Achilles super cord tires manufactured by the Achilles Rubber & Tire Co., Binghamton, New York.

The first of the current year a new corporation, known as the Canton Rubber Works, was formed as a selling organization for the "Three C" inner tube, a product of the C. C. C. Fire Hose Co., which has for thirty years manufactured high-quality fire hose and mechanical rubber goods. The latter firm's experience in making rubber tubing led to the development of a department for automobile inner tubes, which have been well received by the jobbers and distributers being appointed throughout the country. The executive offices of both companies are located at 209 Washington street, Boston, and the factory is at Canton.

FRANK A. SEIBERLING RETIRES FROM GOODYEAR

THE life of Frank A. Seiberling, which is almost entirely woven about the building of The Goodyear Tire & Rubber Co., is that of a man born and educated near Akron, who with $13,500 of borrowed capital, in 1898 started the Goodyear company in an old frame building in East Akron, and in twenty-three years built a $130,000,000 corporation with 80 buildings covering more than 100 acres of floor space and having subsidiaries and branches all over the world.

FRANK A. SEIBERLING

In 1910 the company's sales were $9,000,000; in 1917 they were $111,450,000; while in 1920, the year before the downfall, they were $205,000,000. More than 66,000 men and women were employed at the peak of the company's prosperity, while there were subsidiary plants in California and Canada; cotton mills in Los Angeles, California, and Goodyear, Connecticut, cotton plantations in Arizona; and rubber plantations in Sumatra.

The immensity of the second largest rubber company in the world is shown by the production of more than $10,000,000 worth of balloons and dirigibles for the Government during the war, while figures for 1919 show the consumption of 26,000,000 tons of crude rubber, with manufactures of 7,500,000 tires; 5,000,000 feet of belting; 8,000,000 rubber soles and approximately 20,000,000 rubber heels; and a large amount of sundry products.

All this was the achievement of the restless genius whose goal was to make his firm the largest rubber company in the world. He conceived and carried out things on a large scale, not only in his commercial affairs, but in matters pertaining to the welfare of employes. He was one of the greatest benefactors in the community, building and selling, on small payments, more than 1,100 homes in the addition to Akron known as Goodyear Heights. For the men in the factory he built a $2,000,000 recreation hall, supplied a ten-acre park for recreation purposes, and instituted a welfare department probably unsurpassed by any industry in the world.

Mr. Seiberling gave no evidence of the burden which rested upon his shoulders during the long negotiations while he fought against receivership and its consequent calamity to Akron. The strain has shown in ever-whitening hair, but his smile and genial expression remain. Though sixty-one years of age, those who have been closest to him through his battle of 23 years believe he will be back in the rubber business and that it is only a question of time until he will again hold a predominating position in the rubber industry.

His parting statement, written in the solitude of his office to the Akron he helped to build, is typical of the man.

"My brother, Charles W. Seiberling, and myself sever all official relations with the company, and the control passes into the hands of the bankers as provided for in the reorganization plan. For 22 years we have labored together, with a loyal staff

of as able men as can be found in any organization in this country. What has been achieved the world knows. The nation-wide slump in business last fall brought our business to the verge of disaster. Since that hour I have had but one purpose—to save this company from a receivership. That was accomplished and the new management inherits a business soundly financed and with the finest working organization of any company in the rubber industry in the world.

"My successor is E. G. Wilmer, of Milwaukee, a young man of fine legal training and broad experience in operating business, and with the return of the world to normal conditions there is no reason why Goodyear cannot move forward to a higher plane than it has yet achieved. The bankers in control made me an exceedingly generous offer to continue with the company, which, after careful consideration, I felt justified in declining.

"What I am going to do next I do not know. Since I left school 44 years ago I have labored hard, enjoying my work all the way along, through all its difficulties, up to within the period of the last six months. In truth, I have been tired during that period. The burden is now all off my shoulders. Except for a few days, I have had no vacation for over two years.

"I am going to clear up some of my personal matters next week, then go away for a month's rest, and when I come back I shall go to work—at something."

THE RUBBER TRADE IN OHIO

By Our Regular Correspondent

FEW events in the rubber industry during the past three years have brought about more discussion than the unexpected cut of 20 per cent in tire prices by The B. F. Goodrich Co., which has caused every rubber company in Akron and most of the others in the United States to readjust prices. The angles from which the price cut is viewed by rubber men are as varied as their interests, and when the opinions of bankers and stockholders are added to those of the rubber men a great maze of contradictory opinion results.

Statements from the other companies were unavailable beyond the fact that cost records are being looked over to see if so drastic a cut was justified by decreased material and labor costs. The result becomes apparent in the announcements from the other factories that the reduction on cord tires will average about 10 per cent, on fabrics about 15 per cent, and on tubes about 20 per cent.

The Goodyear Tire & Rubber Co. frankly stated to dealers that neither decreases in cost nor previous prices warranted a 20 per cent reduction and therefore its prices were reduced only to a new average, and this was followed by the other companies. Therefore tire manufacturers are divided into two groups, one following the lead of Goodrich in a 20 per cent reduction, and the other virtually following Goodyear with a smaller reduction. The reduction by Goodrich and its followers brings the decrease in tires to more than one-third in six months, whereas, the other reductions will average close to 30 per cent during the same period. On the new basis prices are back to 1913 levels and approximately 40 per cent below the 1910 levels.

Rubber men point out that the value in tire mileage has more than doubled since six or seven years ago; that with lower prices than in 1910 and mileage more than doubled, the automobile owner is today purchasing tire service at a lower price than at any time in the history of the automotive industry. Five years ago it was estimated that tire costs for each wheel of the automobile averaged between one and one-half and two cents a mile. Today the same costs are now believed to be three-quarters of a cent a mile.

Although all Akron manufacturers have made price adjustments, they do not all believe the cut was advisable or the time was propitious. With large quantities of raw materials on hand, and only a small cut in the price of labor and practically no decrease in overhead expenses, the thing to have done was to stand by the former price levels until the raw materials were worked off and wage adjustments had been completed, together with adjustments on freight rates, which are a large factor in the rubber industry.

The manufacturers who lead in the cut, however, take the position that the readjustment of the whole business and industrial structure depends entirely upon convincing the public that prices of all kinds have hit the bottom; and that in this way the buyers' strike which lead to the depression will be effectually broken.

What the general price reduction will mean in volume of business, remains a matter of speculation. It is still too soon to prophesy, but every rubber company has redoubled its energy to get business in large volume on the basis of the price cut.

TIRE PRODUCTION CURTAILED

During the past month tire production reached its peak. Firestone was making 20,000 tires daily, Goodyear 19,000, Goodrich 15,000, and Miller half of normal capacity. The smaller companies were also active and many had reached 50 per cent normal production. Despite prevailing optimism, the possibility that a recession of tire demand might take place in the near future led manufacturers to look forward to it.

The slump came during the last week in May, and more quickly than was anticipated. The Goodyear Tire & Rubber Co. announced on May 24 that a general curtailment of tire production in the Akron district will take place immediately, although definite figures were not given out. It is estimated that the Goodyear company will lay off over 1,000 men. The reduction in production will probably be gradual beginning June 1.

Firestone has laid off several hundred men and Miller has ordered a reduction of 20 per cent in its office force. It is expected that other tire companies may make similar reductions in office and factory personnel, pending improved trade conditions.

NEW GOODYEAR OFFICIALS

E. G. Wilmer, of Milwaukee, Wisconsin, is the new president of The Goodyear Tire & Rubber Co., succeeding Frank W. Seiberling, who retired with his brother Charles W. Seiberling, on May 13. Paul W. Litchfield remains as vice-president and factory manager, and George M. Stadelman remains as vice-president and sales director. Edwin Palmer, formerly treasurer and recently secretary, has resigned. H. A. Springford is treasurer and Charles A. Stillman, secretary. The directorate consists of J. P. Cotton, New York, N. Y.; F. W. Litchfield; Grayson P. Murphy, New York, N. Y.; J. R. Nutt, Cleveland, Ohio; Robert C. Schaffner, Chicago, Illinois; A. A. Schlesinger, Milwaukee, Wisconsin; George M. Stadelman, Ralph C. Van Vechten, Chicago, Illinois, and E. G. Wilmer.

The new management took charge officially on May 13, although the stockholders approved the sale of the $30,000,000 of 20-year 8 per cent bonds which had been sold, and the issuance of a like amount of debenture bonds with similar terms, at the meeting held May 11. The new management took hold with efficiency at the highest point in the history of the Goodyear company and success now seems assured.

AKRON NOTES

The Firestone Tire & Rubber Co., Akron, announces that every one of its several thousand employes has become a stockholder, each subscriber taking at least two shares, while there was an over-subscription of almost 50 per cent on the new allotment of employes' stock, within twelve hours. The company employs more than 10,000 people, and claims to be the only organization of its rank on record as having every man and woman on its pay-roll a shareholder in the company. The total number of shares subscribed for by employes is now close to 45,000. A production of 20,000 tires a day was reached in Many and practically all

former employes living in Akron were taken back to work.

"However the standard mileage climbs, we must see that the name Firestone always means to the car owner the most miles for his money, most miles per dollar," is a new sign placed where every employe of the Firestone Tire & Rubber Co., Akron, can see it upon entering the factory gate.

Rubber men were much interested in the suggestion made by Secretary Hoover that monthly reports regarding basic industries, including rubber, be sent confidentially to the Department of Commerce to make possible the issuance of monthly reports regarding the status of business and industry. The amount of raw material on hand, the amount of goods finished, the number of men and women employed, and total unused capacity, are among the questions which will be contained in the reports if the system is adopted.

W. F. Ridge has severed his connection with the Rubber Engineering Co., 437 First-Second National Building, Akron. His future plans have not been determined. W. E. McCornish will continue the business under the same company name.

At the annual meeting of the Burt Manufacturing Co., Akron, on May 2, J. Asa Palmer, for eighteen years connected with the company, and for many years general manager, was elected president and general manager, taking the place of W. F. Warden, who died last January. The other officers and directors remain the same.

On the basis of figures published by The B. F. Goodrich Co., the total production of tires since last September is about 8,000,000, and at present, tires are being manufactured at the rate of about one-fourth of the consumption. Requirements for the year are estimated at 2,710,000 tires a month.

E. C. Shaw, formerly vice-president of The B. F. Goodrich Co., has been named a member of a committee of four, appointed by Mayor Carl Beck, to make efforts to bring to Akron one of the two rehabilitation hospitals planned for Ohio by the Government. Dr. W. H. White, member of the committee with Dr. H. S. MacAyeal, and Vincent Stevens, secretary of the Chamber of Commerce, recently went to Washington to lay the Akron proposition before the hospital committee.

James C. Lawrence, of The B. F. Goodrich Co., was elected vice-president of the Akron Rotary Club at the annual meeting. Dr. Parke R. Kolbe was elected president. Hugh Allen, of The Goodyear Tire & Rubber Co., was elected editor of the club publication.

The Flying Squadron of The Goodyear Tire & Rubber Co. had its annual dinner May 7, in Akron, in the factory lunch room at Plant No. 1, and the feature of the occasion was the awarding of diplomas as Master Rubber Worker to 42 men who had completed during the present year the three-year factory course. About 30 others had already received a similar diploma earlier in the year. T. S. Michaels was toastmaster and P. W. Litchfield made the presentations. One of the most impressive events of the evening was the ovation given Mr. Litchfield when the entire assembly rose to its feet and cheered at his appearance, as evidence of loyalty and appreciation of his efforts during the uncertain days through which the company had just passed.

E. E. Helm, publicity director of The Goodyear Tire & Rubber Co., has been named chairman of the Chamber of Commerce Safety Committee, a branch of the National Safety Council. J. R. Burrell, Goodyear industrial engineer, and P. B. Martens, of the Firestone Tire & Rubber Co., are among the other members of the committee.

H. B. Klingerman, industrial engineer of The B. F. Goodrich Co., was the author of an ordinance for the prevention of the smoke nuisance in Akron. The proposed ordinance, which was introduced to the committee of councilmen, follows the lines of nationally adopted smoke prevention measures and provides for a commission to enforce it, also a smoke inspector to work under the building department head.

MISCELLANEOUS OHIO NOTES

W. H. Hurley has been appointed general sales manager of The McGraw Tire & Rubber Co., Cleveland, Ohio, succeeding C. E. Pumphrey. Previously Mr. Hurley was associated with the Ajax Rubber Co. as district supervisor of western territory. With the McGraw company he has served in the following capacities: district manager at Kansas City, having control of the Eastern territory, with headquarters at New York, and a year ago becoming assistant sales manager.

The Chillicothe Tire & Rubber Co., Chillicothe, Ohio, has elected the following directors and officers: H. G. Egbert, treasurer of The Master Tire & Rubber Co., Dayton, secretary, general manager and director; H. J. Alperin, president of the Public Service Tire & Supply Co., Cleveland, vice-president in charge of sales and director; A. Bernstein, president of the Nu-Cord Tire & Rubber Co., Cincinnati, vice-president in charge of purchases and director; C. A. Hertenstein, retaining the office of president; and Walter W. Boulger, reelected treasurer. The capacity of the plant is 500 to 600 tires and tubes daily. For the present nothing but Ford size fabric tires will be made, though ultimately cord and special brand tires will be made. The business will be conducted entirely through jobbers.

The Victor Rubber Co., Springfield, Ohio, reports resumption of manufacturing operations at full plant capacity. Plans for increasing the tire production are being considered. The increased output of the Ford Motor Co. at Detroit affects Victor production as they manufacture a large number of the rubber mats used in the Ford open models.

H. S. Berlin, formerly an executive with the Firestone Tire & Rubber Co. is now president and general manager of the Victor company.

J. J. Moriarity, a prominent tire development and production engineer, has been made factory manager and L. P. Werlein is now manager of the production planning and materials service departments of the Victor company.

T. G. Graham, formerly with The Goodyear Tire & Rubber Co., Akron, and recently factory manager of the Inland Rubber Co., Chicago, has been named factory manager of The Mason Tire & Rubber Co., Kent, Ohio.

The Surgeons' Rubber Glove Co., recently organized by Lee Miller, one of the founders of The Miller Rubber Co., will build its plant in Wooster rather than Cuyahoga Falls. Efforts to sell some of the stock of the $50,000 corporation at the latter place did not meet with the expected response, it was said by officials in making the announcement of the change. Plans for the Wooster building are complete.

Stockholders of the Interlocking Cord Tire Co., Mogadore, Ohio, which was recently thrown into receivership, have placed $25,000 on deposit as their guaranty to operate the plant if the court will raise the receivership. Plans whereby the creditors will be paid off within the year with money to be made out of operation have also been matured. Thus far the court has not rendered a decision on the proposed plan. At the same time Elihu Harpham, receiver, has asked for the balance due on stock which was purchased on a part payment plan, totaling approximately $21,000, ranging in amounts from $100 to $4,900.

ALUM AS A COAGULANT[1]

Alum has long been used by native holders as a latex coagulant and at least one proprietary coagulant contains alum or the active constituent of alum, namely, aluminum sulphate. The acid nature of aluminum sulphate is responsible for the coagulating

[1]Henry P. Stevens. Bulletin of the Rubber Growers' Association, March, 1921, page 142.

properties of alum. The behavior of alum as a coagulant has been investigated from time to time and it was reported to be a little inferior to acetic acid for this purpose. Its use was recommended only in cases where acetic acid was not procurable. It was also pointed out that acids such as sulphuric acid, which were acetic acid one part to 1,200 parts of latex, and alum one probably more harmful, particularly if used in quantities exceeding the minimum needed for coagulation.

To ascertain to what extent potash alum reduces the rate of cure as compared with acetic acid, a number of samples were prepared, vulcanized and tested. The proportions throughout were: acetic acid one part to 1,200 parts of latex, and alum one part to 400 parts of latex.

The difference in rate of cure is altogether negligible. The latex used contained a very small quantity of sodium sulphite and, as the proportions of acetic acid and alum taken were only just sufficient to produce complete coagulation in "unsulphited" latex, it followed that the presence of sulphite resulted in a slightly incomplete coagulation. The residual liquors were milky in almost all cases. The results show that with "sulphited" latex and barely sufficient coagulant to produce a clean coagulation, no difference in the rate of cure results from substituting alum for acetic acid.

In a second series of tests the latex contained no sulphite, and the proportions of acetic acid and alum taken as stated, the samples coagulated with alum cured on an averge ten per cent more slowly than those cured with acetic acid. Incidentally, it may be noted that this series of acetic and coagulated rubbers cured about 20 per cent slower than the crêpe samples of the preceding series. This may be due to unavoidable changes in the conditions of the experiments or the faster curing may have been caused by the use of insufficient acid to produce complete coagulation, resulting in putrefactive changes setting in earlier than in the later series. The effect of excess of acids or acid reacting substances, particularly strong acids, in retarding the rate of cure may quite possibly be due to the inhibiting effect they exert on putrefactive changes, tending to the formation of organic bases.

While it is not possible to make a direct comparison of alum with sulphuric acid, one can indirectly arrive at an approximate estimate of its effect on the rate of cure by comparing the results in both cases with those obtained with acetic acid. The figures appear to indicate that, while alum has a retarding effect on the rate of cure when compared with acetic acid, this retarding effect is greater still in the case of sulphuric acid. Further samples are in preparation for a direct comparison of all these coagulants.

RUBBER TEA-POT SPOUTS IN ENGLAND

A useful little article made of rubber is the tea-pot spout, which is in growing demand in England, and may be used either to protect a china spout from breaking or to replace one already broken The colors most in demand are white and red, although black is also used. In the case of the red and black spouts, care must be taken to use a compound that will not "bloom" after vulcanization.

The manufacture entails considerable hand labor. The material is first tubed to the required diameter, usually just a little under 9/16-inch. After standing for 24 hours the tubing is cut to correct lengths, and into each piece a porcelain, white metal or plaster of paris form is inserted. The spouts are then trimmed carefully, packed in chalk in square tin trays, covered with a piece of thin tin foil to protect them from wetting, and vulcanized. They are then washed in a solution of soda and hot water, then in clean water, dried and finally sewed on cards which hold two dozen of each size, assorted colors, or all one color, as the trade demand may require.—*The India Rubber Journal,* London.

THE "WILLARD"—A QUALITY FOUNTAIN PEN

Though there are numerous styles of these fountain pens manufactured, all have the quality features—self-filling, 100 per cent full, self-starting, self-cleaning, non-leakable, and non-sweating. There are no projections on the barrel, and each pen is fitted with a patented self-regulating automatic feed, preventing dropping and flooding. With these superior qualities the pen having no stubborn tendencies makes writing a pleasure. The barrel is made of the best hand-turned Pará rubber. The gold point is of the best quality and tipped with the hardest iridium.—Willard Pen Co., 318 West 39th street, New York, N. Y.

THE RUBBER TRADE IN THE MID-WEST

By Our Regular Correspondent

THE MID-WEST RUBBER MANUFACTURERS' ASSOCIATION

THERE was marked interest shown at the Mid-West Rubber Manufacturers' Association meeting held in Chicago, May 10. While the Board of Directors was in session in the Chicago Athletic Association, the Cooperative Committee held an important session in the offices of the Association. A plan of action was decided upon by the committee and definite recommendations were made to the Board of Directors.

W. W. Wuchter, Nebraska Tire & Rubber Co., presided at the luncheon served to forty-eight members gathered about a single table. The following were called upon for remarks: J. S. Mouat, Ohmlac Paint & Refining Co.; Scott Kingwell, *Tires;* S. P. Woodard, Gillette Tire & Rubber Co.; R. W. Lyon, The Jefferson Rubber Co.; W. F. Collins, Great Western Tire & Rubber Co.; H. O. Smith, Racine Auto Tire Co.; S. W. Sweet, Electric Motor & Repair Co.; Paul Elbogen, Fred Stern & Co.; Charles Christie, The Hawkeye Tire & Rubber Co.; Wesley Wilson, Akron Rubber Mold & Machine Co.; J. A. Fleischli, The Cupples Co., gave an interesting talk on air bags, and Harry Herb, Harris Trust & Savings Bank, complimented the officers and members of the Association.

The principal speaker was Edward E. Gore, chairman of the Federal Taxation Committee of the Chicago Association of Commerce, who ably discussed the difficulties encountered at Washington in seeking the correction of unjust taxation. He advocated a court of appeals sitting in various centers of the country where speedy corrections could be made.

Twenty-two manufacturers from plants located in Wisconsin, Minnesota, Iowa, Nebraska, Missouri, Illinois, Indiana, Michigan, Ohio and New York met in executive sessions at 3 p. m., and discussed most interestingly the business conditions prevailing in their respective sections at this critical period.

MISCELLANEOUS MID-WESTERN NOTES

R. W. Smith, L. S. Neff and H. A. Boldt, who recently purchased the stock and equipment of the Badger Tire Repair Co., 142 Oneida street, Milwaukee, Wisconsin, and changed the name to the Badger Tire & Equipment Co., hold the offices of president and treasurer, vice-president, and secretary, respectively. They were the former owners of the West Point Tire & Supply Co., 27th and State streets, in the same city, organized as a copartnership by Mr. Smith and Mr. Boldt in May, 1919. The new company is state distributer for the "Liberty" superheated steam vulcanizer, and also carries tires, accessories, and vulcanizers' equipment.

The Allied Golf Company, Chicago, Ill., makers of golf equipment, have elected the following directors: A. J. Musselman, Charles L. West, James S. White, T. Bendelow and C. R. Wagner. There are about 200 stockholders in the company, principally professional golfers, and most of the products are being sold to them at the present time.

The Sieverkropp Engine Co., Racine, Wisconsin, has added to its line a new hydraulic mechanical press in several sizes, for curing automobile tire beads and mechanical rubber goods, as well as a cold press for automobile tire manufacturers. These

are made from recent designs and will stand hard usage. This concern also builds experimental rubber mills and calenders with 7 by 14-inch chilled iron rolls, steel friction gears, and all other parts of semi-steel. In addition, the company builds special machinery from drawings and designs machinery to order.

Leo F. Joliat has been appointed Detroit branch manager of The Miller Rubber Co., Akron, Ohio. He had nine years experience in the rubber business, seven years as salesman and two years as branch manager before joining the sales organization of the Detroit branch in June, 1920. As a salesman he is well-known in eastern Pennsylvania, New Jersey and the Southern Atlantic States. He says his favorite trade magazines are *The India Rubber World* and *Motor*.

The Lomer Armored Tire Co., New Castle, Indiana, is now manufacturing 30 by 3½-inch fabric tires in quantities, and also 35 by 5 steel cord tires. Molds and cores will be installed within the next few weeks, enabling it to manufacture 36 by 6 and 40 by 8 steel cord tires.

The Fort Wayne Tire & Rubber Manufacturing Co., Fort Wayne, Indiana, was adjudicated a bankrupt at a creditors' meeting late in April. David S. Vesey of Fort Wayne, the trustee in bankruptcy, offers to sell the property which consists of two and one-half acres of land, a three-story main factory and four one-story out-buildings. The machinery is of the latest type; capacity 300 tires and tubes daily.

Calvin Stitt, formerly manager of the Boston and Chicago offices of the Katzenbach & Bulloch Co., has been made manager of the heavy chemical, color and oil department of A. Daigger & Co., 54 West Kinzie street, Chicago, Illinois.

"TRAVELER" TIRE OF UNIQUE CONSTRUCTION

A tire with a unique, flat inside construction is known as the "Traveler" tire. It was designed to overcome the tendency of a tire to flatten in use, which weakens the side-walls by excessive strain and eventually causes blow outs. The "Traveler" tire is so constructed that it is in a normal condition, as it was built, when it is running. When it is inflated it is rounded out and the cross-section is elongated, but when the weight of the car is added it returns to its normal shape, flat inside. The tread is very thick, the additional tread being applied to the tire in the place where it is most needed. "Traveler" tires have been on the market a number of years and the maker claims the construction has been thoroughly tested from every angle.—Traveler Rubber Co., Bethlehem, Pennsylvania.

TRAVELER TIRE IN CROSS-SECTION

THE LIFE OF A TIRE IS THE AIR IT CONTAINS. THE MORE AIR, ordinarily, the longer the life. Of course there are exceptions, but it is a safe rule to start with 20 pounds air pressure to the cross-section inch, and if more is needed to add it. Thus a 3½-inch tire will require 70 pounds and a 4-inch tire 80 pounds. Road, load and speed are determining factors in the pressure required.—*Miller News Service.*

THE RUBBER TRADE ON THE PACIFIC COAST

By Our Regular Correspondent

A RECENT feature in the Pacific Coast rubber trade has been a sharp demand for mechanical rubber supplies to meet the marked revival of building operations. Some large dealers, not having anticipated the active resumption, were soon relieved of their small stocks, and were caused much anxiety in obtaining supplies again in a hurry. Oddly enough, bath-room supplies have lagged behind. This is explained by the fact that the rainy season lingered longer this year than usual.

Trade in tires is excellent, and the price cuts made by the big companies have had a stimulating effect on buyers who had been waiting for this move on the part of the manufacturers. While many dealers were protected on guaranties, not a few were caught with goods that had cost them from 15 to 20 per cent more than present prices. One dealer remarked that the price cuts mean a direct loss of $4,000 to him. Giant cushion and pneumatic truck tires are going well, several big dealers not being able to get enough of them.

An excellent business is being done in rubber sports shoes, and the jobbers expect no let-up until September. Trade in druggists' sundries and bathing caps is close to last season's mark, and in rubber bathing suits, capes, etc., mostly novelties, is ahead of last year. Belting keeps up well, although there has been a falling off in demand from Arizona, New Mexico, and other sections where the mining industry has temporarily shut down.

Buyers of goods generally are purchasing much more cautiously than a year ago, doubtless hoping that further price cuts may be made. As the representative of one of the largest rubber concerns in America remarked: "A year ago we were being chased by buyers, now we are chasing them."

LOS ANGELES AND VICINITY.

At the plant of the Goodyear Tire & Rubber Company of California it was stated that things were picking up in good style, the company's April business having been in excess of $1,200,000. In the middle of May the working force had been increased to 1,350 persons, the output of tires to 2,500 and that of tubes to 2,200 daily, fairly approximating 1920's maximum. Milton Kelly, a certified accountant, has been appointed assistant treasurer to succeed D. J. Koonce, who has gone into another line of business. The refinancing plans of the parent Goodyear company in Akron have made no change in the affairs of the California concern.

The B. F. Goodrich Rubber Co.'s branch at 946 Broadway, Los Angeles, will be moved by September 1 to new quarters in Building E, Terminal Building. The whole seventh floor will be used, and a space of 80,000 square feet occupied, as compared with the present 35,000 feet.

W. F. Lynch has been promoted to the position of manager of the Los Angeles branch of The Mason Tire & Rubber Co., Kent, Ohio. For two years previous he was a salesman in the Cleveland branch, covering western New York and eastern Pennsylvania. Prior to his connection with the Mason company, Mr. Lynch was salesman for the Myers Rubber Co., Cleveland, for three years.

C. C. Case, general manager of the mechanical goods division of the United States Rubber Co., with headquarters in New York, has been visiting all the company's main branches on the Coast.

F. H. Hearsch, formerly western district manager for the Kelly-Springfield Tire Co., has accepted the position of general sales manager of the Samson Tire & Rubber Corporation, Compton, California.

The National Airless Tire Co. will shortly begin the construction of a factory in Norwalk, near Los Angeles, for making non-puncturable, "Los Angeles Airless" tires. The company's of-

fices are in the Grosse Building, Sixth and Spring streets, Los Angeles. The officers are: O. A. Lane, president; H. D. Smith, vice-president; C. F. Evans, treasurer, and C. H. Braden, secretary and general manager.

The Pacific Rubber Ace Co., 281 I. W. Hellman building, Los Angeles, California, advises it has not yet started production but is planning to manufacture the inner tube known as "Rubber Ace," under a royalty paid to the Elgin Rubber Ace Co., Elgin, Illinois. The Pacific company's territory under Elgin covers the states of New Mexico, Arizona, California, Nevada, Oregon, Washington, Idaho and Utah. The company's factory and offices will be located in Los Angeles.

SAN FRANCISCO AND VICINITY.

J. B. Brady, San Francisco branch manager of the United States Rubber Co., has just covered the leading Coast cities and he is enthusiastic about business prospects for 1921.

Ralph Boydston, formerly Goodyear Tacoma branch manager, has taken charge of the new San Francisco branch of the Sound Rubber Co., Tacoma, Washington.

L. G. Lehousse has been appointed special Pacific Coast representative of the United Rubber Co., a subsidiary of The Portage Rubber Co., Akron, Ohio. In 1918 he was appointed resident Pacific Coast manager for the sales department of The Dreadnaught Tire & Rubber Co. of Maryland, Baltimore, Maryland, and in November, 1919, was made Pacific Coast manager of the Los Angeles and San Francisco branches of the Portage company.

B. W. Perks, who since January, 1920, has been in charge of the New York branch of The Portage Rubber Co., Akron, Ohio, has been transferred to the Pacific Coast where he will succeed L. G. Lehousse as Pacific Coast manager of the Los Angeles and San Francisco branches, with headquarters in San Francisco.

The Fresno Tire & Rubber Co. has bought a 7½-acre tract at Belmont for a 3-story concrete factory with a capacity of 500 cord tires and 1,750 tubes a day. The force will number 400 men. Walter S. Munger, president of the Superior Oil Co., heads the concern.

SOUTHWESTERN NOTES.

A somewhat more cheerful tone, due to a reviving demand from tire makers, pervades the cotton market in the Southwest, even though the cotton-planted acreage in the Salt River Valley, Arizona, has dropped from 185,000 in 1920 to less than 75,000 in 1921. Encouragement was felt in the announcement of plans for a million-dollar cotton mill in Los Angeles that will provide large quantities of duck, drills, etc., for rubber and other manufacturers. Some bankers look upon the slump in the cotton industry in the Southwest as a godsend to that section, as the ranchers have learned the lesson that it does not pay to plunge wholly on cotton, but to diversify their crops. With 91½ per cent of the land sown by the Salt River Valley Water Users' Association under cultivation, as compared with 88½ per cent last year, it is estimated that, with varied crops and improved roads, the actual cost of producing cotton may be but half that of last year.

It is stated on good authority that the amount of cotton being held for sale in Salt River and Yuma Valleys, Arizona, and Imperial and San Joaquin Valleys, California, totals 225,000 bales, valued at $22,000,000. Bankers, who realize the need of finding a foreign market for these holdings, are urging support for the Foreign Trade Financing Corporation. The organizing committee of the corporation in this section is composed of leading business men, one of them being A. F. Osterloh, vice-president and general manager of the Goodyear Tire & Rubber Company of California.

The Spreckels "Savage" Tire Co., of San Diego, now at 95 per cent capacity, reports business as particularly good. R. M. Utt, formerly with the Howe Rubber Co., has been made coast representative. J. A. Michels is making a trip over the "Kite territory" and finds trade looking up sharply.

The Ajax Rubber Company of Texas, Inc., 431 Main avenue, San Antonio, Texas, was incorporated under the laws of Texas on December 8, 1920. The officers are: L. D. Ormsby, president and treasurer, San Antonio; F. C. Burnett, vice-president, Dallas—both in Texas; and W. J. Jackson, secretary, New York, N. Y. This company assumed the interests of the former branch of the Ajax Rubber Co., San Antonio, and covers entire southwestern Texas. The company will wholesale Ajax products.

The Universal Tire & Rubber Association, Houston, Texas, has contracted to lease its plant to the Standard Rubber Co., New Orleans, Louisiana, for the period of one year, with an option to purchase the plant. Friendly receivership proceedings were instituted by the officers of the association that its properties might be conserved during the period covered by the contract.

NORTHWESTERN NOTES.

At the annual meeting of the Portland Rubber Workers Club, Portland, Oregon, the following officers were elected: T. R. Conway, president; Charles Voyle, vice-president; and W. T. Peters, secretary and treasurer. The directors elected for the year 1921 were: E. R. Morris, E. L. Harper and J. T. Bailey. The club is carrying on several activities dealing with the education of the public as to the use and care of tires.

A Federal Reserve report states that Pacific coast retailers of automobile tires lead other business lines in liquidating stocks and ordering new goods.

Tire dealers state that the reduction in prices of several well-known automobiles has had as much to do with increasing sales as the cuts made by the large tire manufacturers. There is a good demand for "spares," not part of the standard equipment.

An enterprising and rapidly growing concern is the Sound Rubber Co., Tacoma, Washington, maker of tubes and casings exclusively.

The Dutho Rubber Co. has opened a general tire and tube repair factory at W925 First avenue, Spokane, Washington, with a $16,000 equipment. C. H. Moller is manager and Charles W. Zahn, secretary.

CALIFORNIA BARS METAL TIRES.

The bill—Senate 789, introduced by Mr. Rominger—that passed the California Legislature and was signed by Governor Stephens, virtually prohibits the use of metal tires, or wood or rubber tires having any portion of the tread studded or coated with metal, on any highway of the state.

An exception is made in favor of tire chains. The new law is an amendment to the General Highway Act of 1915. Another provision of the new act is: "No solid rubber tire shall be used on any motor or other vehicle or contrivance for moving loads over any public highway or bridge unless such tire has rubber on its entire traction surface, at least one-inch thick above the edge of the flange."

RUBBER CEMENT FOR MOUNTING PHOTOGRAPHS

Paste has long been an unsatisfactory material in mounting photographs and other illustrations, as the edges curl, and unless the backing is heavy, the pictures do not lie flat, while excess paste smudges the mounting. Pure rubber cement has many good qualities, in fact all that paste has not. Rubber cement does not stretch photographs when mounting, does not buckle them, does not curl up photograph or mounting no matter how thin, and leaves no mark when excess cement is removed. One of the greatest benefits of the rubber cement over paste is that once a photograph is mounted it can be removed without damage by the simple expedient of loosening a corner and pulling off the print.—New York Belting & Packing Co., 91 Chambers street, New York, N. Y.

PROCESSING TIRES, TUBES AND BELTING

SOME NEW AND INTERESTING STATEMENTS

WHAT may be termed an "elixir of youth" is administered to old or new tires and tubes by a new concern, and the results claimed for the treatment are marvelous. For instance, one 35 by 5 "Silvertown" cord tire which had been run 10,815 miles was taken to an expert repair man for a retread. The repairer saw the breaker strip showing in several places, the tread so thin, and the tire so generally used up that he pronounced it an incurable case. Some one suggested trying a new-fangled "process" treatment another repair man was endeavoring to introduce. The worn casing was duly "processed," nothing being added to it nor anything taken away, and returned to the skeptical owner. The latter testifies that since then the tire has run 5,700 miles more, and has given a year and five months of hard service without retreading or rubber addition.

Claims made for the process are that it not only imparts new life to "semi-baked" fabric and rubber compounds "deadened" by vulcanizing heat, adding much to cushion and resiliency, but that by toughening the tread it adds from 50 to 100 per cent to the mileage. It is also asserted that all oil in old tires is removed and the original color restored. New tires, it is said, can be benefited as much as old ones. The process has not been patented, is a laboratory one, and the details are a secret.

According to the written statement of the processing company: "Tires may be processed if they have not been run too far, or if there is a foundation left to work upon, giving many more miles of wear and greater elasticity and physical strength to both fabric and cord tires. The process is a help to both the fabric and the rubber, bringing to life the fabric, and toughening the rubber, making the tires all resilient. All makes of tires and tubes may be processed, giving 50 to 100 per cent more mileage to new tires and a corresponding increase to used tires, according to the life left in them."

The inventor of the process then writes:

"I am through with the tire people who turn over the tires, after I have processed them, to the development departments, where they are merely dissected to learn what I do, after it is understood between us that the only test is to run processed tires side by side with non-processed tires of the same kind, and under the same conditions.

"The best tire made, as regards quality and material, is not prime when finished in the factory. The extreme heat and pressure used in manufacture dries out the oil and wax that nature put in the fabric, and also dries up the compound, so that the tire begins aging at once.

"I restore the pliancy and resiliency all through, and make the tread tougher, staying the aging. My process can restore to good condition overcured or undercured tires, new stiff hard tires, or those hardened by age, in or out of use.

"My process consists of an unpatented chemical formula having some rubber capabilities, and is to be used in a secret process in combination with chemical immersions according to the condition of the tire; thus tending to improve, 'after manufacture' into automobile tires, inner tubing and rubber belting 'compositions,' the capacity for an increase of some of the 'attributes' as provided by gum elastic rubber when used in sufficient quantities.

"This chemical formula and accompanying processes will have the effect of creating an 'auxiliary,' associated with rubber and acting as a 'liberator' thereof and part substitute therefor, in a stiff, continually aging and hardening rubber composition article designed for active movement."

STANDARD PACKINGS FOR RUBBER FOOTWEAR

A Canadian rubber footwear concern has adopted the system of packing 30 pairs of light rubbers in a case, instead of 25 as heretofore; and 15 pairs of heavy footwear, instead of 12. The larger cases are said to cost no more and the expense of closing, stenciling and handling is the same as before. The customer gets a better assortment of sizes, especially in heavy goods, without so many end sizes, enabling him to make a quicker turnover; and freight and express charges are proportionally less on repeat shipments.

While United States manufacturers have not adopted the methods of their Canadian confrères, they are shipping rubber footwear in cheaper fiber cases. Buyers state that the goods are received in good condition and with a considerable difference in the freight rates.

A CANADIAN LEADER IN RUBBER CHEMISTRY

IN THIS AGE of specialization the rubber chemist has come to occupy a peculiarly important position among production executives. One of the most outstanding authorities whom Canada has produced in this important field is William B. Wiegand, director in charge of rubber manufacture for Ames Holden McCready Limited, Montreal, Canada.

W. B. WIEGAND

Mr. Wiegand was born in Conestogo, Ontario, in 1889 and was educated in the public and high schools of Toronto, Ontario, and the University of Toronto, where he received his M. A. degree in 1912 with high honors, being gold medalist in chemistry. After a year of post-graduate work on the faculty of the university, he went into the Morgan & Wright factory and laboratory at Detroit, Michigan. The following year he joined the staff of the Dominion Tire Co., Limited, Kitchener, Ontario, as chief chemist. In 1915 he was transferred to the Canadian Consolidated Rubber Co., Limited, Montreal, Canada, as general technical superintendent, going in 1919 to Ames Holden McCready Limited as director in charge of rubber manufacture. He is also a director of the Ames Holden Tire Co., Limited, and of the Ames Holden Felt Co., Limited, both of Montreal, Canada.

Ever since 1915 Mr. Wiegand has been responsible for the manufacturing and technical problems relating to tires, footwear and mechanicals, and has made a hobby of applying the specialized knowledge and "tricks" of each division to the problems of the others. He is the author of several technical papers read before various chemical societies, two of which have been published in recent issues of THE INDIA RUBBER WORLD; he is also joint patentee of an impregnated fiber for footwear manufacture.

He is a Fellow of the Canadian Institute of Chemistry, also a member of the American Chemical Society and of the Society of Chemical Industry, London, England.

CANADIAN NOTES

Pioneer Products of Canada, Limited, 11 St. Sulpice street, Montreal, handle "Air-peds" in Canada for Pioneer Products Co., 35 West 39th street, New York, New York. These rubber heel and two-part rubber sole "Air-peds" were described in THE INDIA RUBBER WORLD, April 1, 1920.

Stephen A. Howell succeeds Harold R. Cole as manager of A. Schrader's Son, Inc., Toronto branch. Mr. Howell who was formerly in charge of the Chicago branch joined the company in 1915. Mr. Cole is now at the main office in Brooklyn, New York.

American vs. European Practice in the Rubber Tire Industry

By Albert H. Myers[1]

HAVING returned recently from a visit abroad in the interests of a certain branch of the rubber industry, the writer believes that probably his observations would be of interest to others who are connected with the industry in this country. The territory covered comprised the greater part of England and France, and the following applies principally to the pneumatic tire-making industry of those countries. The reader should remember that immense tire manufacturing plants are not to be found in Europe. However, there are several plants in England and France which are of a fair size and capable of producing about 5,000 tires a day, compared to our larger plants in this country which can produce from 20,000 to 35,000 tires in a day of 24 hours.

FABRIC VS. CORD TIRE

The regular fabric tire is mostly produced in Europe at the present time, but manufacturers on the other side are increasing the production of the cord tire, which is still in its infancy over there. There are also other manufacturers who have not yet produced cord tires for the trade, but who are making experiments along those lines. One of the prominent cord tires in Europe today is made by laying individual cords, approximately ⅛-inch in diameter, in two or more layers on an iron core by an automatic machine. This was the method first used in America for making cord tires, but is now discarded, and in its place a cord fabric composed of small individual cords is used. These cords are approximately 3/64-inch in diameter and are laid about 23 to the inch. The size and the number of cords per inch vary with different manufacturers.

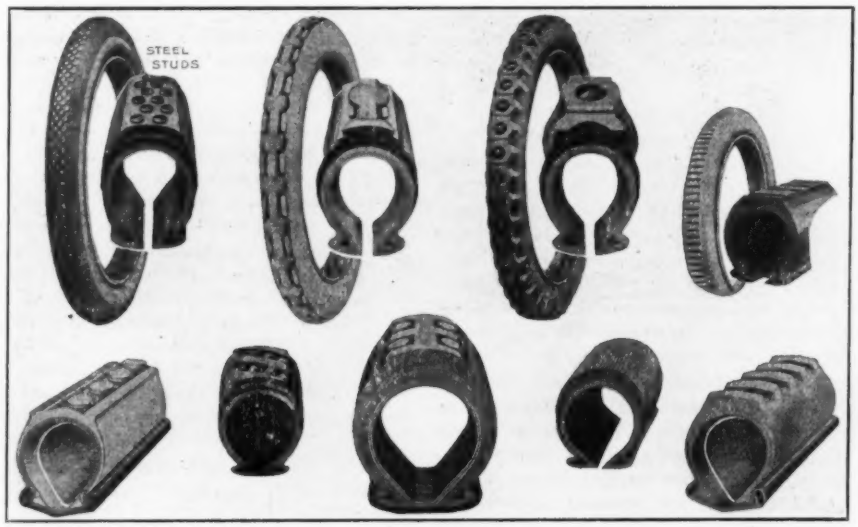
In the built-up single cord method, the cords are passed through a semi-liquid rubber compound and cabled to size, while in the cord fabric method the fabric is first passed through a rubber-spreading machine, after which it is frictioned and skim-coated on a calender.

REASONS FOR FABRIC TIRES

As the fabric tire is most popular in Europe, comparatively heavy investments have been made in machinery for its production, and consequently many fabric tires will be made for some time to come. Among the special machinery installed for fabric tire production in Europe is the 90-inch calender of which there is a number. These machines weigh as much as 100 tons. Contrary to the statements made in this country that calenders of such large dimensions are not successful, the writer did not hear of any complaints while abroad, the users being more or less enthusiastic about them. One reason why such large machines have been adopted is that due to the greater width of fabric which can be handled, a lesser number of joints are required when building a tire carcass.

A great many smaller tires are now being made, due to the increasing number of light pleasure cars coming into use. The typical car for the average person, especially in England, is smaller than the Ford car produced in this country. The high rate of taxation abroad has made necessary the development of a a small car for the man with average means. It is not uncommon for this class of car to average 30 to 40 miles to a gallon of gasoline. The roads are generally excellent, which tends to higher mileage for the fabric tire than that realized in this country.

The pneumatic tire for bus service in cities is apparently not making much headway. One of the prominent omnibus companies has experimented for about a year to find out if the pneumatic tire was superior for their service. It claims that, all things considered, such as up-keep, etc., the solid rubber tire is superior. Although for touring service, such as the heavy char-à-bancs, the pneumatic tire is generally used.



REPRESENTATIVE EUROPEAN TIRES, SHOWING TREAD DESIGNS IN USE

TYPICAL TREADS—THE STRAIGHT-SIDE TIRE CONTROVERSY

A number of representative European tires are shown to give an idea of some of the different tread designs in use. The steel-studded tread is still commonly seen, and the principal reason for its existence today is the fact that there are city ordinances still in force which make it compulsory to have at least one of these tires on all taxicabs and like vehicles.

The controversy relative to the advantages of the American straight-side tire versus the clincher tire, is unsettled and probably will remain so and take its place beside other customs which are peculiar to the countries involved. The writer did not observe any straight-side tires that were made abroad. Those being shipped over from America are for use on American cars sold in Europe.

EUROPEAN RUBBER MACHINERY

Relative to machinery used in the rubber industries of Europe, it must be remembered that the pioneer plants are as old as ours, but European manufacturers have not been so quick to throw out the old and install the new as we have in the United States; consequently, they do not get the great amount of production for floor space involved that we do. The older mills and calenders run about half the speed of present-day American machinery; the hydraulic vulcanizing presses are generally of the bolted type; in fact, manual labor is used to a much greater extent than in this country. The size of rubber mills generally does not run over 60 inches in roll length, with the exception of where an 84-inch size may have been purchased for use as a

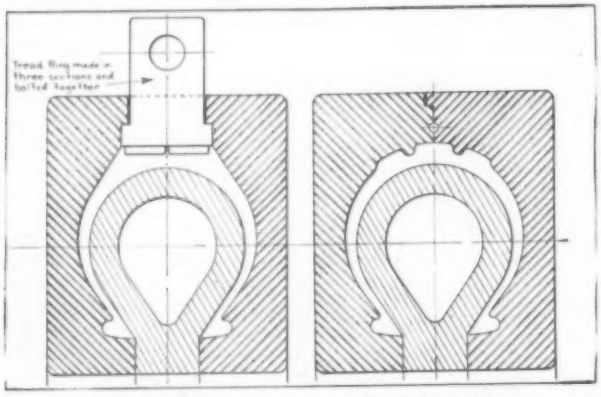
[1]The Wellman-Seaver-Morgan Co., Akron, Ohio.

warming mill for one of the large calenders previously mentioned.

Safety appliances are not as much in evidence abroad as they are in this country. However, the subject is being given more attention with the machinery being installed today. The method of stopping mill lines is mostly by dynamic braking of the motor instead of the familiar clutch brake seen in this country. This, of course, is due to the prevailing use of direct electric current.

EUROPEAN THREE-PART MOLD

The wrapped tread method of curing tires is in considerable use abroad, but where a mold is used it is often of the three-part type that is shown in the accompanying illustration. The mold consists of a top and bottom plate, an outer, or tread



THREE-PART MOLD
European Type

TWO-PART MOLD
American Type

ring, made in three sections, and bolts for bolting the sections together. In operation the three sections of the tread ring are brought together around the uncured tire by screwing up the nuts on the bolts which hold the rings together. Then the top and bottom plates are positioned, and the mold placed in the vertical hydraulic vulcanizing press and squeezed together, and the tire cured. It requires three men from ten to fifteen minutes to handle one of these molds—a waste of time, which in the United States would be deemed deplorable. It must be remembered, however, that some of the tread designs used in Europe could not be made clean cut in any other way, so that the remedy is really a redesign of the tread. A typical American tire mold is also illustrated for comparison. The simplicity of its use is readily seen.

THE FLOOD OF AMERICAN TIRES

The writer was surprised to find that a great number of American tires are used abroad, but does not wish to infer that the European manufacturers are not awake to opportunity. This is not so. It is due to being hindered by their obligations that keeps them from expanding as we do in America. It must be remembered that they have been hit harder than we have in the course of events, and therefore do not seem to be overflowing with optimism.

The present flood of American tires in some of the European countries may or may not continue, as it is possible that steps may be taken in the near future to make it more difficult for the American tire manufacturer to compete. This, of course, is a matter of conjecture, but it is well to bear in mind that the present favorable situation may not last.

NO SPRING FAIR AT DANZIG

Consul William Dawson reports that the Danzig city authorities have decided not to hold a spring fair in 1921, but that a fall fair is planned.

RADIUM—A SAFETY FIRST FACTOR

Time and again it has been shown that the scientific curiosity of today becomes an industrial necessity tomorrow. For some time after the discovery of radium in 1902 by M. and Mme. Curie in Paris, the rare radioactive metallic element served little other purpose than that of affording a subject for curious speculations by physicists on matter and energy. Next, the discovery was made that radium had a certain curative value in cancerous and other affections. Finally came an exact and practical application of the newly-found element as a luminous coating superseding the old-time paints made of sulphide of barium or calcium, which chemicals emitted a steadily failing glow after exposure to strong light. The advantage of the radium paint is that it needs no light to impart phosphorescence, it glows of its own accord, and the luminosity it affords is practically perpetual.

One of the first uses to which radium-luminous material was put on an extensive scale was the marking of watch and clock dials to make them easily visible without other light. Now, managers of rubber mills, as well as heads of other factories throughout the country, are closely studying its importance as a "safety first" factor in lessening the chances of their employes being injured. They are finding out that wherever danger lurks in darkness radium-luminous material may be used to largely eliminate life and limb hazards to their employes.

Electric switches, for instance, are often put in nooks and corners of mills where the least fumbling in the dark might mean electrocution to the operator. The efficiency of a fire alarm or a fire extinguisher is greatly increased by having it made visible in the dark. Guards for gear wheels are often illuminated thus, as well as perilous parts of many machines, as an extra safeguard in case of the failure of electric lamps while the machines are being used. It is often necessary to locate telephones, emergency call bells, etc., before time can be taken to reach the switches and turn on electric lights. Often high-pressure gages, installed as an insurance against dangers, are deprived of much of their safety value through inconstant lighting; but their dependability can be greatly enhanced by applying a preparation which makes them luminous 24 hours a day.

AMERICAN ARMY TIRES IMPORTED FROM FRANCE

The American tire trade has been somewhat exercised by reports concerning the importation from France of a considerable stock of standard American makes of pneumatic and solid tires. These were a portion of the American army supplies sold to the French Government as surplus material. THE INDIA RUBBER WORLD has received the following information on this subject, from its French correspondent.

"The French Government is liquidating these purchases, and about 200,000 tires from this source have been sold to speculators at very low prices. A certain quantity remains in France, going to buyers of American vehicles which were also derived from the liquidation, but the greater part of those sold have been shipped to the United States.

"It seems that this stock was bought at 40 per cent of its 1914 price, and it is reported that the French buyers divided their profit equally with the purchasers. The tires are not in very good condition as the storage was very defective. The huts where they were held being in poor condition, the tires were exposed to light and inclement weather.

"Other quantities are still for sale, as the stocks are said to have amounted to almost a million pneumatic tires. It is possible that they will be bought back by the same agents and shipped to the United States as rubber scrap."

Serious consideration has been given to the possibility of preventing the entrance of these tires into the United States but no effective measures can be found. It is apparently a matter for the individual makers to consider with respect to guaranties on these tires.

The Rubber Trade in Great Britain

By Our Regular Correspondent

WHATEVER the future may have in store for the trade, it is difficult to be optimistic at the moment. We are now at the end of the fifth week of the coal strike with its general discomforts and bad effects on trade. The dispute as to the reduction in rubber workers' wages is now in the hands of the Rubber Manufacturers' Association and the Workers' Unions, as the Whitley Council seems to have come to an end. The waterproof garment makers to the number of about 5,000, the great bulk of whom are located in Manchester, have now been on a strike for five weeks against the proposal to reduce their wages 17½ per cent, and a settlement does not seem to be imminent. With regard to rubber workers generally, notice of a 10 per cent reduction was first posted by the Leyland & Birmingham Rubber Co., Limited, but this was subsequently withdrawn in view of an official statement to be issued by the Manufacturers' Association. However, discussions are still proceeding with the leaders of the workers' unions.

Rubber workers in the Lancashire area have consented to the following reductions: ten per cent less to male workers; wages of men over 21 years not to fall below 52*s.* 6*d.* for a 47-hour week; 5*s.* per week less to female workers, the wages of those over 18 years not to fall below 27*s.* 6*d.* for 47 hours; half a crown less to workers under 16 years. These terms are only temporary because the operatives' officials have been instructed to press for an advance of wages at the end of three months and also for the standardization of the rubber industry throughout the country. Regular rubber manufacturers have been more affected by the slump than those who specialize in electric cables, rubber card clothing, lawn tennis balls, etc. While the rubber manufacturers are working only two or three days a week the above concerns and others not referred to, are on full time. Reclaimers seem to have been hard hit, some works being closed down altogether for the time being and others working only a fraction of the week. It looks as if the expected trade revival will not immediately benefit the reclaimers as there is little indication of a substantial rise in the price of raw rubber.

The trade generally remains in a depressed condition and apparently wages and probably salaries will have to be reduced to keep business going until the revival of trade, which will come if costs can be brought down. Owing to dullness in the rubber industry, and coal accumulations, the coal strike has not caused any stoppage of work. In some cases where rubber works draw electric power from the municipal works the supply has been curtailed.

RUBBER ROADWAYS, LIMITED

This company was formed in 1913 and financed by the Rubber Growers' Association and some of the plantation companies with the object of experimenting in rubber-paved roads. The first experiments were not very successful and about a year ago a street in Southwark, London, notorious for its heavy traffic, was laid with rubber blocks attached to steel plates. It was found that the rubber became worn on the under side and detached from the steel plates by the heavy traffic. A new method is now under trial and appears to have given very satisfactory results. In this case the rigid steel plate is replaced by one of expanding metal, the idea of the borough engineer whose further report will be awaited with general interest.

FINANCIAL NOTES

The report of J. Mandleberg & Co., Limited, of Manchester, for 1920, shows a decline in profits due to what the directors describe as the unprecedented fall in values. The net profit is £76,206 against £102,882 for 1919. As there was a substantial carry-over and no addition is being made to the reserve, there need have been no reduction except for the fact that the capital was largely increased last year. This necessitates a reduction in the dividend to 15 per cent against 22½ per cent in 1919, the carry forward being £109,553.

The electric cable business of Johnson & Phillips, Limited, of Charlton, London, had a good year, the dividend being maintained at 12½ per. cent. Additional working capital, however, is needed to cope with the growth of the business and the intention is to enlarge the borrowing powers and create £350,000 first mortgage debentures, the combined total of which is about £119,000.

F. Reddaway & Co., Limited, the well-known belting manufacturer of Manchester, is paying 8 per cent on the ordinary shares for 1920 the same as in the two previous years. Although rubber belting and mechanicals are largely made at these extensive works the firm is chiefly known for its textile belts.

Metropolitan Vickers Electrical Co., Limited, whose works at Trafford Park, Manchester, were formerly known as the British Westinghouse Co., Limited, shows an increase in net profit of £83,231 over 1919 and the dividend on the ordinary shares has been raised from 8 to 12½ per cent. At the meeting, the chairman, J. Annan Bryce, referred to the clouds which had come over the bright prospects with which the year began. All sensible men, he said, recognized that the worker should be helped to maintain in part, at least, the improved standard of living which he enjoyed during the war, but there must be a fall in wages and this would cause a fall in the cost of living. The claim that a shorter working day would not cause a decrease in output had not proved correct. So far from that being the result, even the output per man per hour was less, with the result of an immense reduction of output and increase of cost. This made it difficult to compete with other countries where this state of affairs did not exist.

OYLERS, LIMITED

Oylers, Limited, London, which has recently failed, was formed in 1911 to take over an existing business largely concerned with the manufacture of rubber surgical goods. The London premises were later added to by the acquisition of the large unused building forming part of the electricity works at Richmond, Surrey. Here the Rapson tire was produced, or partly here and partly in London. The petition for compulsory liquidation was filed by the Isleworth Rubber Co., Limited, creditors for £2,147 though a larger sum £10,180 is said to be due to J. C. Mason. The profit for 1919 was £4,988 and for 1920 £7,069. The total liabilities are put at £82,745 and the deficiency on realization of assets at £68,857. There does not seem any possibility of the business being continued.

INDUSTRIAL RESEARCH ON INSULATING MATERIALS

An interesting and important account of the results obtained by the special committee appointed by Vickers', Limited, appeared in *Engineering*, April 22. The work was carried out at the Ioco Rubber & Waterproofing Works, Glasgow, by some of the scientists engaged at the associated Vickers' concerns, though W. T. Glover Co., Limited, was not represented. Insulating material for electrical apparatus and plants as distinct from cable insulation was largely obtained from Germany and America before the war and the main object of the research was to encourage the manufacture of this material at home. The work was principally concerned with varnished cloth, a material which has long been a specialty made by Glovers, and in which permanent flexibility is required so that transformer coils may be

insulated without the surface cracking. The "tendering" effect of fatty acids produced by oxidation of the varnish film can be kept at a minimum only by careful control of the temperature of storing. If this is too high, a hard film forms on the surface of the varnish while the varnish imprisoned below gradually oxidizes on storing, and as the fatty acids cannot escape they cause great damage to the cotton fiber. Varnished silk, adhesive tape and varnished paper are material specially referred to. It has been known for some time that Vickers, Limited, has been interested in the synthetic resins of the phenol formaldehyde condensation type and it is here stated that where, in addition to electrical properties, a built up sheet or cylinder has to withstand a sudden stress or shock, as in transformer work, the use of a synthetic gum is preferable to shellac. I note the term gum is used instead of resin. In the case of shellac, there is no chemical change after applying it to the paper, but with synthetic resins the cylinders wound with it are subsequently baked to complete the condensation which insures a body of great hardness and insolubility in alcohols and oils. With regard to the use of synthetic resins, the demand exceeds the supply and the two or three makers are certainly not working short time.

It is said that a fusion of interest has been made between holders of American and German Bakelite patents of which there seems to be any number, but this combine does not cover all those who are engaged in the exploitation of synthetic resins which are bound to prove a very serious competitor to vulcanite. It is clear that high scientific control of electrical insulation is of the greatest importance because of the increasing tendency to higher voltages and larger units and Vickers has done good service in allowing its results to be published. It is noticeable, however, that no details of the formulas of the varnishes are given, a fact which will not cause widespread surprise.

BRITISH NOTES

W. H. Davis, formerly a director of the United Oversea Co., Limited, of London, in charge of the rubber department, has now opened offices at Thames Chambers, Beer Lane, London, E. C. 3, as a produce commission merchant, making a specialty of crude rubber.

Irwell & Eastern Rubber Co., Limited, Ordsalle Lane, Salford, Manchester, England, has changed its name to The Greengate & Irwell Rubber Co., Limited, at the same address.

GREAT BRITAIN REDUCES TIRE PRICES

In Great Britain tire prices have been reduced approximately 10 per cent, and in one case a further reduction of £1 ($4.8665 at normal exchange) a tire is noted. A number of accessories have also been reduced ten per cent.

BRAZIL AT THE LONDON RUBBER EXHIBITION

Brazil is to be represented at the forthcoming London Rubber Exhibition by Hypolito de Vasconcellos and Hannibal Porto. Both gentlemen are well-acquainted with the industry and possibilities of Brazil. Mr. Vasconcellos is also well-known in London, where he was Brazilian Consul, while Mr. Porto is a well-known writer on economic and agricultural problems of his own country.

NORWAY REGULATES PNEUMATIC TIRE SIZES

The Norwegian authorities have found it necessary to regulate traffic to suit the roads instead of building the roads to carry the increased traffic. This is due to the enormous expense which would be involved. New regulations provide that motor trucks of 1¼-tons capacity, and less, are not permitted on the roads unless equipped with pneumatic tires. It is specified that tires from 1 to 2 inches greater than the standard size would have to be placed on American trucks if they were to be used on the Norwegian roads. Also that the weight of the truck and the load together must not exceed 5 tons. This practically limits the trucks to 2½-ton sizes or less.

THE RUBBER TRADE IN EUROPE

By a Special Correspondent

FRANCE

THE Société Française de Caoutchouc "Montsouris," 33 rue Voltaire, Puteaux, has raised its capital to 2,000,000 francs. This firm manufactures all kinds of articles of hard and soft rubber.

It is reported that the Manufacture Parisienne de Caoutchouc, 19 rue de la Pépinière, Paris, is actively engaged in completing the factory bought from Forges aux Etablissement Fredet. M. Giraudin is in charge of the management of this factory, where the rubber to be used at the other factories of the company will be treated. The factory will be ready to operate in a few months' time.

It may be recalled that the Manufacture Parisienne de Caoutchouc last year acquired three other factories specializing in rubber manufacture and belonging to the Colonial Rubber Co. and to Maison Michel Jackson. These three factories are situated at Prouvy-Thiant, near Valenciennes, at Halluin (in the north), and at Menin (Belgium), and since their acquisition have undergone considerable changes in the way of reconstruction and expansion, which are at present almost completed.

GERMANY

Recently published official statistics for September, 1920, show that the total German foreign trade in rubber for that month amounted to 3,700 quintals (one quintal equals 220.46 pounds). Of this, 800 quintals were imported and 2,900 quintals were exported. The total imports for the period January to September, 1920, came to 18,100 quintals, while exports were 20,000 quintals, in comparison with 34,500 and 152,300 quintals, respectively, for 1913.

The value of exports in September, 1920, was 26,300,000 marks and for the nine months ended September, 1920, 184,600,000. Only soft rubber goods were imported in September, 1920, and amounted to 800 quintals; for the first nine months of 1920 these articles were imported to an amount of 17,900 quintals, against 33,700 quintals in the same period of 1913. In September of last year the exports of soft rubber goods were 2,700 quintals; for the months January—September, 1920, the figures were 18,900 quintals as compared with 141,200 quintals during the corresponding period of 1913. Imports of hard rubber goods were 200 and 800 quintals for the first nine months of 1920 and 1913, respectively. Exports of these goods came to 200 quintals in September, 1,100 quintals during January—September, 1920, and 11,100 quintals for the corresponding period in 1913. The value of soft rubber goods amounted to 22,500,000 marks for September and 158,000,000 for the months January—September, 1920, while the value of the exports of hard rubber during the same periods averaged 3,800,000 marks and 26,600,000 marks, respectively.

Dr. F. Kuhlemann, a director of the Vereinigten Gummiwarenfabriken, Harburg-Wien, Germany, returned last month after a brief business visit to the United States.

GERMAN RUBBER COMPANIES' PROFITS

An examination of the annual reports of the most important German rubber manufacturing firms shows that in general satisfactory profits were made during 1920. As in other countries, business was better during the first part of 1920 than toward the latter part of the year. More than one concern complains of difficulties due to the coal situation in Germany, while the high cost of production was also a more or less disturbing factor.

The Continental-Caoutchouc- und Gutta-Percha-Compagnie, Hanover, reports that in spite of the greatest efforts to obtain sufficient coal, work had to be partly stopped from time to time. During 1920, the sum of 52,684,668.14 marks was spent on coal alone. However, it is expected that the recent purchase of the greater part of the shares in a coal-mining company will help to improve matters as far as coal is concerned.

The working capital was 284,163,502.03 marks and net profits amounted to 14,426,294.16 marks. The report gives a summary of the welfare work done during the year. Expenses for employes in accordance with the requirements of the law amounted to 1,002,812.86 marks; voluntary welfare work cost 2,258,619.52 marks. This latter includes the expenditure of 400,000 marks to cover the cost of sending the children of all the employes to the country for four weeks. Every man who has worked to the company's satisfaction for 10 years receives a life insurance policy of 1,500 marks as a gift. At present 1,303 workers possess such policies, or bank books if they cannot be insured. Office employes are presented with policies ranging from 1,500 to 5,000 marks on completion of their 10 years of service. All these policies are paid out immediately at death or when the holder has reached the age of 65 years. At present 501 office employes hold such policies.

The Mittelland-Gummiwerke A. G., Hanover-Linden, reports net profits amounting to 1,807,330.73 marks. A dividend of 6 per cent on 300,000 marks of preferential shares was declared, as well as 25 per cent dividend on 4,200,000 marks original shares, plus a bonus of 10 per cent on these shares. It was further decided to increase the capital of 4,200,000 marks to 6,600,000 marks.

At a recent meeting of the Kabelwerk Duisburg A. G., in Duisburg, it was proposed to declare a dividend of 16 per cent and a bonus of 9 per cent as in the year before. Net profits for the year 1920 were 2,952,843 marks.

The C. Müller Gummiwarenfabrik A. G., were able to report net profits of 481,651.64 marks for 1920 and as in 1919, declared a dividend of 15 per cent.

The Mannheimer Gummi- Guttapercha- und Asbest-Fabrik, A. G., Mannheim, declared a dividend of 24 per cent for the year 1920. Net profits were 1,253,343.83 marks.

The Bremer Gummiwerke Roland A. G., Bremen, reports that 1920 was more favorable than the previous year. Net profits for the year under review were 197,683.48 marks, and it was possible to declare a dividend of 7 per cent.

The Gummiwerke "Elbe," Aktiengesellschaft, Piesteritz, near Klein-Wittenberg (Elbe), reports a satisfactory year. Net profits amounted to 488,387.26 marks and dividends of 4 per cent and 12 per cent were proposed. The company's statement shows the great increase of costs and expenditure from 659,534.73 marks in 1914, to 1,488,695.61 marks in 1918, 2,576,350.77 marks in 1919 and 7,712,339.23 marks in 1920.

Vereinigte Berlin-Frankfurter Gummiwarenfabriken had net profits of 1,315,637.86 marks and were able to declare a dividend of 15 per cent as in 1919.

NEW FIRMS

Aachener Pneumatic-Reparatur Anstalt S. Saul G. m. b. H., Aachen; repairing of pneumatic tires, manufacture and sale of protectors, repairing material, etc.

Polo Gummigesellschaft Freudmann & Co., Barmen.

Lindener Gummiwarenfabrik G. m. b. H., Hanover, manufacture and sale of all kinds of goods made of rubber or similar material.

Firma Carl Mettler, G. m. b. H., Trier; trade in technical goods of rubber and asbestos, electrical goods, etc.

Mineralöl- und Asbest-Gesellschaft m. b. H. (formerly A. Neuhaus), Paderborn; import and export of mineral oils and fats, technical goods of rubber and glass, asbestos goods, belting, etc.

Gummiwerk Odenwald, G. m. b. H., Mümling-Grumbach (in Odenwald). Manufacture of rubber goods and regenerated rubber, sale thereof.

Firma Tetra A. G., Chemnitz, manufacture and sale of all kinds of hygienic fabrics and articles made thereof; capital, 1,000,000 marks.

Firma Fritz Holzhey, Frankenberg, Saxony; import and manufacture of technical oils and fats, trade in belting, rubber and asbestos goods, stuffing-box packing and all kinds of technical goods.

THE LEIPZIG SPRING FAIR

In spite of political troubles, it seems that the Leipzig Spring Fair was to a certain extent successful and that the turnover was satisfactory. As usual, large numbers of people came from all parts of Germany and quite a number of foreigners were present—Americans, Swiss, Austrians and even Englishmen and Frenchmen. Since the war forced manufacturers to resort to substitutes, rubber at the Leipzig fair has not been so well represented as was the case this time. It is claimed that both quantity and quality were surprisingly good. Everything in hard and soft rubber, gutta percha, celluloid and similar materials, that in pre-war days found a place at the fair, was once more represented. Exhibits of surgical, hygienic, optical and household goods of rubber were particularly complete and numerous. While certain hygienic and sporting articles were poorly represented as late as the last fall fair, much that was interesting in these lines was now to be seen. All sorts of technical goods, bathing caps, tires, soles and heels, jar-rings, toys, balls and hard rubber goods were exhibited in quantity. Prices were favorable and it is not expected that they will be further reduced.

RUBBER FACTORIES IN CZECHO-SLOVAKIA

The most important rubber factories in Czecho-Slovakia are:

Vereinigte Berlin-Frankfurter Gummiwarenfabriken, branch in Grottau, Bohemia. There are warehouses of this enterprise in Vienna, Budapest and Prague. Main factories are in Berlin and other German places. At Grottau about 300 workers are employed. The articles manufactured are principally technical and surgical rubber goods; pneumatic tires for automobiles and other vehicles, rubber soles and heels.

Gummi-und Balatawerke "Matador," in Pressburg. About 230 persons are employed at this factory which turns out chiefly technical rubber goods.

Prager Gummiwarenfabrik Wysocan of the "Semperit" Oesterreichisch-Amerikanischen Gummiwerke, A. G. Technical rubber goods of all kinds, asbestos, rubber goods and high pressure plates are made here. A subsidiary is the Prager Asbestund Gummiwerke, G. m. b. H., which manufactures packing of all kinds as well as asbestos and rubber goods.

Schneck & Kohnberger, Gummiwarenfabrik (limited liability company), have a rubber weaving establishment at Odrau, Silesia, and a cotton spinning and cotton throwing factory at Josephtal near Bensen. The works employ about 800 persons and besides the above produce technical rubber goods of all kinds, insulation bands, high pressure plates, rubber heels, rubber threads, bandages, garters and suspenders.

FOREIGN TARIFFS

BRITISH INDIA

A bill of March 1, revising the custom duties of British India, fixes an import tariff of 11 per cent ad valorem on gums, resins and lac of all sorts, and on rubber tires and other manufactures of rubber except pneumatic tires and tubes for motor cars including motor lorries, motorcycles, motor scooters, bicycles and tricycles, on which there is a duty of 20 per cent ad valorem.

BELGIUM

On March 31 Belgium passed a bill providing for an import duty of 12 per cent ad valorem on motorcycle, cycle, and other vehicle parts and detached pieces including tires of rubber or rubber combined with other material, whatever be the predominating material.

SWEDEN

The prohibition on the exportation from Sweden of rubber boots and shoes (Tariff No. 641) was withdrawn in a decree on March 16.

CHILE

The Chilean law dated February 23, increasing import duties, covers balls, former rate of duty 0.12, now 0.25 pesos per kilogram gross; and rubber toys, formerly 2.50, now 5.00 pesos per kilogram gross.

BRAZIL

Two presidential decrees maintain in force the preferential customs treatment accorded to certain articles of United States and Belgium origin on importations into Brazil. This treatment consists of a reduction of duty for both countries of 20 per cent on rubber manufactures coming under No. 1033 of the Brazilian Tariff.

MEXICO

Mexican export duty on chicle has been changed from 15 cents (United States currency) per kilo (2.2 pounds) to 6 per cent ad valorem. These duties are fixed bi-monthly.

In a decree promulgated April 19, and effective on the 23rd, Mexican duty is increased on rubber tires for automobiles from 1 peso (50 cents) per gross kilo to 1.50 pesos per gross kilo of 2.2 pounds, and on rubber tires for motor trucks from 0.50-peso (25 cents) to .75-peso (37¼ cents) per gross kilo.

GERMANY

An order dated April 29 permits the following articles to be exported without license:

> India rubber, gutta percha and balata, crude or refined, and waste; used pieces of wares of these materials; "factice" and other rubber substitutes; wares of soft rubber falling under Tariff Nos. 570 to 581; hard rubber and wares of hard rubber falling under Tariff Nos. 582 to 586.

POLAND

An order provides for the payment in paper currency, with an "agio" of 400 per cent (at the rate of 5 paper marks for each gold mark prescribed by the Customs Tariff) on the following imports:

> Rubber driving belts, rubber hose, with or without fabric, with or without spring inside, without metal covering on the outside; rubber for packings; technical articles of rubber, not combined with fabric; hemp and cotton driving belts (balata), also with addition of paper yarn; canvas for making driving belts.

SIBERIA

The government of the so-called Far Eastern Republic has temporarily prohibited the export of rubber in all shapes and also manufactured automobiles, motor cycles and parts

NETHERLANDS EAST INDIES

The following export duties are to take effect on August 16, 1921:

Rubber	Export Duty ad valorum
When the market price per ½-kilog. amounts to—	
0.825 florin or less	Nil
More than 0.825 but less than 0.90 florin	¼%
0.90 florin and more but less than 1 florin	½%
1.00 florin and more but less than 1.10 florins	1%
1.10 florin and more but less than 1.20 florins	2%
1.20 florin and more but less than 1.30 florins	3%
1.30 florin and more but less than 1.40 florins	4%
1.40 florin and more but less than 1.50 florins	5%
1.50 florin or more	7%

The duty on rubber in slabs will be the duty on rubber as prescribed in the Export Tariff, decreased by 12 per cent.

THOUGH THERE IS NO NATIONAL REGISTRATION OF MOTOR CARS and trucks in Finland it is estimated that there are about 1,500 passenger cars and 300 to 400 motor trucks. Formerly Germany and Italy met the requirements of this market, but now American cars are preferred. Six hundred thirty-one motor trucks and automobiles were imported into Finland during the first nine months of 1920, about 100 of which were American and the balance German. During this time rubber tires amounting to 323,507 kilos were imported. All automobile tires are imported, the main sources being the United States, Great Britain, Germany and Sweden. Clincher, straight side or quick detachable types are used.

RUBBER IN THE BRITISH WEST INDIES

THE following notes on rubber in the British West Indies appear in an article by C. A. Brown.[1]

While the exportation of rubber from the British West Indies has not attained a leading economic importance, a large amount of investigation has been conducted by the Imperial Department of Agriculture[2] concerning the adaptability of the various rubber-producing trees to the climatic conditions of the different islands. In localities which have an evenly distributed rainfall of over 75 inches a year and a minimum temperature of not less than 65 degrees F., such as obtain in parts of Trinidad, Dominica, and Tobago, the Pará rubber tree (*Hevea brasiliensis*) thrives well, giving on properly cultivated plantations an average yield of 200 pounds of rubber an acre. The Castilloa rubber tree grows better in districts with a moderate rainfall, but the yield of rubber is much less than with Hevea. With the latter tree there is a steady flow of latex nearly all the year, while with Castilloa there is but little wound response and the trees must be tapped at frequent intervals. The problems of tapping the Castilloa and dealing with its latex give difficulty and have not been perfectly solved.

Probably over three-fourths of the plantation rubber made in the British West Indies is coagulated from the latex by means of acetic acid; lime juice is also extensively employed. According to Collens[3], the cheapest and most efficient coagulating agent is a five per cent solution of sulphuric acid, in the proportion of ten drops to 100 cc. of latex. The rubber coagulated by this means was found to be of excellent quality and showed no signs of deterioration.

In the process employed on plantations, the clotted cream, which rises to the surface of the coagulated latex, is gently washed, pressed, and then allowed to dry a day. The "biscuits" of rubber thus prepared are then smoked for three or four days until they become transparent, during which interval they take on an amber color and acquire a characteristic smoky smell.

The chief obstacle to the development of plantation rubber in the British West Indies is the scarcity of cheap labor; for this reason it is doubtful if the industry there will ever achieve the same degree of success as it has gained in Ceylon and the Malay States.

[1] "Industrial and Agricultural Chemistry in the British West Indies." Journal of Industrial and Engineering Chemistry, 13, page 78.
[2] In charge of Sir Francis Watts, Imperial Commissioner of Agriculture.
[3] "Rubber Experiments in Trinidad and Tobago." West Indian Bulletin, 13, 219.

THE RUBBER TRADE IN THE FAR EAST

By Our Regular Correspondent

MALAYA

JUDGING from what one can glean locally, it seems that the advocates of a "shake-out" (a survival of the fittest) are going to win from those in favor of crop restrictions, and preferably, compulsory restriction by 50 per cent. The effect of a "shake-out" would of course be that the poorer concerns would go to the wall and the industry be left in the hands of the wealthy companies who might take the opportunity of combining to keep prices at a profitable level and thus safeguard the rubber industry. Others consider that to drop the entire matter and wait for the survival of the fittest would prolong the present state of depression, without really benefiting anybody in the end. It is interesting to note that the "shake-out" is even looked forward to by some of the small planters.

The attitude of the local government may be said to be helping a "shake-out," at least the indications are that it will probably not intervene to assist the rubber industry by enforcing restriction and by giving financial aid to those concerns in need of it. While it is recognized that government interference in aiding an industry is economically unsound and hence undesirable, still it

is held that the case of rubber is exceptional, for the welfare of Malaya practically hinges on its rubber prosperity.

While the Government is taking its time to announce its policy, more companies are closing down or dismissing members of their European staffs and discharging coolies. The market, too, as might have been expected, is in a pretty uncomfortable state; it is said that there have been about nine big failures in the rubber market at Singapore within the last six months, and it is further reported that two more firms in Singapore are in financial difficulties.

Of course present conditions are making people grumble about everything, and not without some reason. The indifference of the Government has been duly criticized, the Rubber Growers' Association got its share first of all, now the Planters' Association of Malaya has been condemned as futile and inefficient, while finally the Incorporated Society of Planters is practically asked to give an account of its activities, particularly as far as concerns aiding unemployed planters.

The manner of handling the coolie problem by many estates is also strongly disapproved of. It is feared that the wholesale discharge of coolies, resulting in the return to their native land of large numbers of unemployed with discouraging tales of conditions in Malaya, will create much difficulty when better times return and more labor will be required. It is foreseen that such a situation would help to maintain coolie wages at the high level reached before the slump and thus needlessly add to the cost of production, while the present really offers the best opportunity to lower wages to a suitable level.

SOUTH INDIA

A correspondent of the *Indian Scientific Agriculturist* points out the necessity for a wider use of all kinds of improved machinery in Indian agriculture. On rubber estates tractors, ploughs, and harrows could be used to advantage and would replace the large numbers of coolies now required and incidentally diminish the worries and anxieties which the employment of large numbers of coolies entail.

Concerning the effect of the slump on local rubber estates, it is stated that while certain concerns are faring badly, since yields are lower here than in other rubber-producing centers, yet so far none have closed down and it is hoped that this step will not be necessary.

The new rubber mycologist, H. T. Ashplant, is expected to arrive shortly.

It is reported that the rate on tea and rubber from the Malabar Coast (southwest coast of India) to London has been further reduced to 65*s*. per shipping ton, less the usual rebate of 10 per cent.

NETHERLANDS EAST INDIES

Under present conditions, when the press in Ceylon and Malaya, and particularly in the latter region, is urging the need of more thorough and scientific rubber research, it is interesting to note what is being done in this direction for the rubber industry in Java.

First there is a well-staffed Department of Agriculture, Industry and Commerce, at Buitenzorg, Java, besides a Phytopathological Institute (under a highly qualified director) with entomological and mycological laboratories. At the head of each of these laboratories is a chief assisted by three entomologists, or mycologists, and the institute also has an experimental garden with an expert in charge. Then there is a General Agricultural Experiment Station with a staff of twelve experts, of whom three are analysts and three rubber experts. Two of the six experiment stations which provide scientific information for the Dutch rubber industry are devoted exclusively to rubber. Each of these stations has an able staff of experts, from three to eight in number. There is also a physiology fund for scientific research on the physiological rôle of latex in Hevea with a research officer in charge. The expense involved is borne partly by the Government, partly by the planters' associations and partly by the producers.

It is quite evident, therefore, that in the Netherlands East Indies rubber research is taken very seriously and, as might be expected, is ahead of its Malayan and Ceylon neighbors in this respect.

CHANGES IN PLANTATION RUBBER AFTER STORAGE IN THE TROPICS[1]

This is a topic in which interest has of late revived owing, of course, to the present condition in the rubber industry. The general opinion is that plantation rubber and particularly crêpe is not stable under tropical conditions. Dr. de Vries admits that the external appearance of the rubber loses on keeping; thus the color of pale crêpe darkens decidedly and takes on a grayish or brownish yellow tint; smoked sheet becomes dull and loses its brightness. However, the internal qualities on the whole seem to be unaffected. Thus, in samples kept from 2 to 4 years in locked cupboards, and lots kept for two years packed in chests in a godown, tensile strength and slope remained unchanged; the rate of cure generally showed a small increase, while viscosity was the only property that showed a marked change. Samples kept for a short time showed a decided increase in viscosity, while keeping for a longer time resulted in a decrease in viscosity, often markedly so. Both first-grade and the better kinds of second-grade rubber showed nothing more than these slight changes after having been stored for varying lengths of time.

Crêpe from matured rubber behaved in general in a manner similar to that of first-quality crêpe, tensile strength and slope remained approximately the same, but the rate of cure generally decreased somewhat instead of increasing as in the case of first-quality rubber. The viscosity lost its high values and came down to normal or low ones. Here it is interesting to note that while rapid-curing rubber loses in rate of cure when stored, it was found in the case of several samples of abnormally slow-curing rubbers, that storage had the effect of increasing the rate of cure. Abnormalities in rate of cure, therefore, in many cases tend to return somewhat to normal when rubber is kept for some time, which is to say that storage helps to lessen the variability of plantation rubber.

Samples of ill-prepared native rubber from Borneo and Djambi deteriorated markedly on keeping and lost appreciably in tensile strength and viscosity.

CEYLON

NEW USES FOR SCRAP CREPE

In two Colombo office buildings rubber carpets have been laid on the staircases by way of an experiment. The carpets are made of refuse rubber, the center portion being of black lower-grade scrap crêpe and the white borders of better quality scrap crêpe. The rubber is not vulcanized or treated in any way and, it is understood, the strips of which the carpet is made are hammered together after having been heated.

It now remains to be seen how they will wear and whether the rubber will become tacky. Owing to the fact that the grade of rubber used in the carpets has now no commercial value, it is difficult to give any idea of their commercial cost. However, one of the two planters who have made these carpets, claims that he can manufacture the carpet at a cost of 34 cents (normally about 11 cents in United States currency) per square foot.

It is held that the success of this experiment might lead to a big local industry. One or two of these locally made mats have been sent to the Rubber Exhibition in London. Meanwhile, it is gathered that the Rubber Control Committee might raise objections if the sale of such carpets and mats was placed upon a business footing, because under the Rubber Growers' Association restriction scheme the grade of rubber from which these carpets are made should be destroyed.

[1]Dr. C. de Vries, in the Archief voor de Rubbercultuur in Nederlandsch-Indie, 5th year, No. 3, March, 1921.

Recent Patents Relating to Rubber

THE UNITED STATES

GRANTED MARCH 29, 1921

O. 1,372,715 Milk bottle stopper. B. F. Morledge, Columbus, Ind.
1,372,757 Pneumatic tire valve for attachment without removing tire from wheel. F. W. Lanchester, London, Eng.
1,372,760 Oil-proof rubber piston packing reinforced with rubber-coated fabric. H. C. Loudenbeck, Pittsburgh, assignor to The Westinghouse Air Brake Co., Wilmerding—both in Pa.
1,372,794 Collapsible rim for tires. O. H. Bartholomew, Peoria, Ill.
1,372,858 Armored tire inner-liner. S. I. Baer, Youngstown, Ohio.
1,372,887 Pneumatic tire. John Lardos, Akron, Ohio.
1,372,893 Hot-water bottle. W. H. Miller, Canton, Ohio.
1,372,938 Peripheral rubber band for protecting tire casing from wear. P. T. Coffield, La Mesa, Calif.
1,372,963 Combined dust and valve cap for pneumatic tires. Albert Kufner, Salem, Ore.
1,372,977 Maternity garment with elastic insert. Annie Prokesch, New York, N. Y.
1,373,018 Rectal syringe and water-bag. Richard Falmer, Teaneck, N. J.
1,373,062 Eraser and holder. L. W. Faber, New York, N. Y., assignor to Eberhard Faber Pencil Co., a New York corporation.
1,373,068 Pneumatic tire pump removably mounted on spoke of wheel and having air-tube connection with tire. J. L. Harper, Seattle, Wash.
1,373,111 Resilient tubeless tire containing hermetically sealed hollow spheres surrounded by rubber interposed between layers of fabric and rubber, and the whole vulcanized together. A. H. Young, Oakland, Calif.
1,373,123 Garter. W. Ferguson, Philadelphia, Pa.
1,373,239 Hose supporter. B. C. Harriss, New Rochelle, New York.
1,373,287 Cushion heel. A. H. Ammann, Peotone, Ill.
1,373,306 Hose supporter. C. A. Cunninghan, Atlantic City, N. J.
1,373,325 Toy airplane. C. G. Gorby, Atwater, Calif.
1,373,360 Shower-bath brush. L. A. Trial, Chicago, Ill.
1,373,370 Resilient tire with inflatable inner tube. Ernest Veltung, New York, N. Y., assignor to Veltung Steel Tire Co., a Delaware corporation.

GRANTED APRIL 5, 1921

1,373,423 Comedian's inflatable suit simulating a ball. I. W. Gruhl, Los Angeles, Calif.
1,373,453 Pneumatic tire alarm. O. F. Schroeder, Santa Ana, Calif.
1,373,472 Molded rubber battery vent. Harry Weida, Highland Park, N. J., assignor to India Rubber Co., a New Jersey corporation.
1,373,485 Inner tube. O. T. Bugg, Poughkeepsie, New York, assignor by mesne assignment to Canvas Inner Tube Co., a Delaware corporation.
1,373,652 Resilient wheel. James Cunningham, St. Louis, Mo., assignor to Demountable Spring Tire Co., New York, N. Y.
1,373,713 Waterproof hat protector. J. F. Schweizer-Caillaux, Vincennes, France.
1,373,803 Syringe attachment. Louis Dunn, Minneapolis, Minn.
1,373,880 Yarn comprising an elastic rubber core and cover of fibrous material spun upon and around said core. I. Garon, Duluth, Minn.
1,374,099 Demountable rim for tires and means for locking. Louis H. Perlman, New York, N. Y.
1,374,100 Demountable channel rim for tires. Louis H. Perlman, New York, N. Y.
1,374,101 Demountable rim for tires. Louis H. Perlman, New York, N. Y.
1,374,104 Demountable rim for tires and means for locking into place. Louis H. Perlman, New York, N. Y.
1,374,106 Demountable rim for tires. Louis H. Perlman, New York, N. Y.
1,374,107 Demountable rim for tires. Louis H. Perlman, New York, N. Y.

GRANTED APRIL 12, 1921

1,374,272 Detachable rim for tires. H. C. Babel, Buffalo, N. Y.
1,374,301 Raincoat. F. W. Howard, New York, N. Y.
1,374,382 Air-chill for pneumatic tires. R. W. Mellor, Girard, Ohio.
1,374,390 Resilient tire with solid rubber core surrounded by sponge rubber, etc., all parts being vulcanized together. G. W. Rode, Jr., Brooklyn, N. Y.
1,374,397 Inflating device for tires. M. C. Schweinert, West Hoboken, and H. P. Kraft, Ridgewood—both in New Jersey.
1,374,426 Fountain drawing pen. H. Burkhardt, Rueschlikon, Switzerland.
1,374,430 Bath spray for attaching to faucet, adapted to fasten in loop around shoulders. M. F. Chevalier, Baldwin Park, Calif.
1,374,458 Vaginal washer. T. H. Larson, Oshkosh, Wis.
1,374,480 Vulcanized boot or shoe. L. A. Trull, Williamsport, Pa., assignor to Lycoming Rubber Co., a Pennsylvania corporation.
1,374,570 Air-bag core for pneumatic tires. A. Huetter, assignor to The Allsteel Riedwell Tire & Rubber Co.—both of Dayton, Ohio.
1,374,572 Hose supporter. N. M. Hurd, Chicago, Ill.
1,374,623 Life preserver suit. O. A. Youngren and J. A. Watt, assignors to National Life Preserver Co., all of New York, N. Y.
1,374,634 Inner tube. G. G. Card, assignor to The Columbus Climax Rubber Co., both of Columbus, Ohio.
1,374,637 Pneumatic tire. De Leon Davis, Richmond, Va., assignor to Unity Tire & Manufacturing Co., a Delaware corporation.
1,374,668 Cord tire fabric. G. W. Lindley, Philadelphia, Pa.
1,374,741 Protective valve for inflating bladders, etc. C. J. Jensen, North Plainfield, N. J.
1,374,752 Cushioned wheel. A. A. Mendenhall, Duluth, Minn.

GRANTED APRIL 9, 1921

1,374,904 Tire construction. J. G. Carillon, Barberton, Ohio.
1,374,930 Adjustable rim for tires. David Lazarus, New York, N. Y.
1,374,957 Inner tube for pneumatic tire. B. C. Seaton, Nashville, Tenn.
1,375,032 Inner tire cushion. J. W. Burgess and G. F. Burgess—both of Kansas City, Mo.
1,375,046 Endless belt strap, etc., of impregnated fabric. A. M. Hardy, Bowmanville, Ontario, Canada.
1,375,283 Welt strip for making rubber welts with fibrous core. E. W. Dunbar, assignor to Apsley Rubber Co.—both of Houston, Mass.
1,375,360 Electrical apparatus for vulcanizing rubber. W. B. Burke, Cleveland, assignor to The Electric Vulcanizing Rubber Co., Akron—both in Ohio. Original application divided.
1,375,372 Disk wheel for pneumatic tires. G. H. Forsyth, Harvey, Ill.
1,375,435 Demountable rim for tires. A. W. Woodward, assignor to the Firestone Steel Products Co.—both of Akron, Ohio.
1,375,511 Combined hat protector and covering for a raincoat. F. W. Howard, New York, and G. B. Cannon, Jr., Brooklyn—both in New York.
1,375,527 Tire casing. C. W. Miegel, Jersey City, N. J.
1,375,559 Fountain pen. Duncan Cameron, Edinburgh, Scotland.
1,375,633 Nail for attaching rubber heels to shoes. H. D. Hamilton, Winthrop, Mass., assignor to United States Shoe Machinery Corporation, Paterson, N. J. (See THE INDIA RUBBER WORLD, September 1, 1919, page 701.)

GRANTED APRIL 26, 1921

1,375,681 Brush with rubber bristle-cushion, and cover containing mirror. E. A. Dennin, Troy, New York. (See THE INDIA RUBBER WORLD, May 1, 1920, page 503.)
1,375,682 Squeegee. W. J. Dennis, Chicago, Ill.
1,375,825 Patch for pneumatic tires. J. R. Buechler, Akron, Ohio.
1,376,048 Pneumatic tire nipple and alarm. Hugo Stommel, assignor of one-half to H. Raymond—both of Metuchen, N. J.
1,376,115 Reversible sleeve attachment for pencils or pens. A. F. Record, Kokomo, Ind.
1,376,121 Kite, captive, or observation balloon. Charles F. Smyth, assignor to Connecticut Aircraft Co.—both of New Haven, Conn.
1,376,257 Storage battery. T. R. Cook, East Cleveland, assignor to Willard Storage Battery Co., Cleveland—both in Ohio.

THE DOMINION OF CANADA

GRANTED MARCH 29, 1921

209,841 Rubber heel thicker at back than front, etc. J. Demirjian, Elyria, Ohio, U. S. A.
209,846 Attachment for pens having flat knife blade on one end and rubber tip on the other. H. W. Earp-Thomas, Richmond, Va., U. S. A.
209,866 Universal joint consisting of layers of canvas or fabric treated with rubber. E. J. Hardy, Coventry, Warwickshire, Eng.
209,902 Rubber heel. F. A. Nolan, St. Paul, Minn., U. S. A.
209,916 Revolving duplex rubber heel. H. W. Rogers, Pittsburgh, Pa., U. S. A. (See THE INDIA RUBBER WORLD, January 1, 1921, page 262.)
209,983 Rubber heel. The National Rubber Heel Co., of Canada, Ltd., St. Catharines, Ontario, assignee of Lamartine B. Fay and John Ferkras, coinventors—both of Elyria, Ohio, U. S. A.

GRANTED APRIL 5, 1921

210,022 Cycle saddle of vulcanizable material. J. Jelley, Coventry, and H. Jelley, Birmingham—both in England.
210,027 Pressure gage for pneumatic tires. M. C. Schweinert, New York, N. Y., and H. F. Kraft, Ridgewood, N. J., coinventors—both in the U. S. A.
210,064 Tire pressure gage. W. A. DeWolfe, Consort, Alta.
210,069 Resilient shoe sole having a rubber layer between the inner and outer soles. J. B. Frechette, Valparaiso, Ind., U. S. A.
210,090 Waterproof sole. L. Hofmeister, Milwaukee, Wis., U. S. A.
210,120 Mat woven from resilient cords to serve as non-skid device for pneumatic tires, with means for attaching. W. C. McGeorge, San Francisco, Calif., U. S. A.
210,128 Hair waver. M. L. O'Dell, Montreal, Quebec.
210,203 Shoe upper. The La Crosse Rubber Mills Co., assignee of Edgar S. Bott—both of La Crosse, Wis., U. S. A.

GRANTED APRIL 12, 1921

210,307 Device with rubber bulb, for repairing radiators. T. E. Henderson, Fort Worth, Tex., U. S. A.
210,338 Pneumatic tire with metal blocks embedded in tread. R. G. Mercer, Toronto, Ontario.
210,382 Hydrometer. J. Steiner, Long Island City, New York, U. S. A.
210,392 Reservoir pen. A. E. Wade, Rock Ferry, Chester, Eng.
210,430 Cushion tire for vehicles. The Goodyear Tire & Rubber Co., assignee of J. E. Hale—both of Akron, Ohio, U. S. A.

GRANTED APRIL 19, 1921

210,625 Atomizer. A. Levy, Boulogne-sur-Seine, France.
210,668 Fountain marking brush. M. M. Shackett, New York, New York, U. S. A.
210,774 Garter. The Penn Brothers Suspender Co., Inc., assignee of three-fourths of the interest, and G. Green Penn, assignee of one-fourth interest—both of Madison, North Carolina, U. S. A.

GRANTED APRIL 26, 1921

210,997 Cream separator with bulb, etc. G. A. Yeatter, Battle Creek, Mich, U. S. A.
211,047 Cushioned wheel with solid rubber tire. The Redden Resilient Wheel Co., assignee of Eugene E. Redden—both of Springfield, Mass., U. S. A.
211,051 Dust cap for tire valve. A. Schrader's Son, Inc., New York, N. Y., assignee of C. T. Shaffer, San Francisco, Calif., U. S. A.

Chemical Patents will be found on pages 660-661. Machinery Patents on pages 669-670.

THE UNITED KINGDOM

PUBLISHED MARCH 23, 1921

157,016 Tire rim. C. F. Rubsam, 407 Society for Savings Building, Cleveland, Ohio, U. S. A.

157,017 Pneumatic tires. W. J. Mellersh-Jackson, 28 Southampton Buildings, London; Morgan & Wright, Jefferson avenue, Detroit, Mich., U. S. A.

157,025 Pneumatic tire. E. P. Altenburg, New Tread Tire Co., Columbiana, Ohio, U. S. A.

157,031 Detachable tire shoe with rubber tread for adapting tractor wheels to use on roads. Schneider et Cie., 42 rue d'Anjou, Paris.

157,106 Pneumatic tire. de L. Davis, 2039 Green street, Philadelphia, Pa., U. S. A. (Not yet accepted.)

157,132 Self-propelling nozzle. S. C. Sladden, 233 Broadway, New York, assignee of J. T. Burns, Corona, Queens Borough, both in New York, U. S. A. Not yet accepted. (See THE INDIA RUBBER WORLD, September 1, 1919, page 702.)

157,151 Construction of pneumatic tire to assist in attaching to rim. Federal Rubber Co., assignee of B. C. Dowse, both of Cudahy, Wis., U. S. A. (Not yet accepted.)

157,170 Dust cap for tire valves. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, assignee of H. P. Kraft, 219 Godwin avenue, Ridgewood, N. J.—both in U. S. A. (Not yet accepted.)

157,171 Water-bottle stoppers. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, assignee of M. C. Schweinert, 42 Riverside Drive, New York—both in New York, U. S. A. (Not yet accepted.)

157,172 Pressure gage for pneumatic tires. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, N. Y., assignee of H. P. Kraft, 219 Godwin avenue, Ridgewood, N. J.—both in U. S. A. (Not yet accepted.)

157,173 Water-bottle stoppers. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, assignee of M. C. Schweinert, 42 Riverside Drive, New York—both in New York, U. S. A. (Not yet accepted.)

157,174 Tire-inflating valves. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, N. Y., assignee of H. P. Kraft, 219 Godwin avenue, Ridgewood, N. J.—both in U. S. A. (Not yet accepted.)

157,175 Construction of tire valve to assist in attaching stem to tube. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, N. Y., assignee of H. P. Kraft, 219 Godwin avenue, Ridgewood, N. J.—both in U. S. A. (Not yet accepted.)

157,176 Dust cap for tire valve. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, assignee of M. C. Schweinert, 42 Riverside Drive, New York—both in New York, U. S. A. (Not yet accepted.)

157,177 Pipe couplings, etc. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, assignee of M. C. Schweinert, 42 Riverside Drive, New York—both in New York, U. S. A. (Not yet accepted.)

157,178 Dust cap for tire valve. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, N. Y., assignee of H. P. Kraft, 219 Godwin avenue, Ridgewood, N. J.—both in U. S. A. (Not yet accepted.)

157,179 Interchangeable dust cap for tire valves. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, N. Y., assignee of H. P. Kraft, 219 Godwin avenue, Ridgewood, N. J.—both in U. S. A. (Not yet accepted.)

157,180 Dust cap for tire valve. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, assignee of M. C. Schweinert, 42 Riverside Drive, New York—both in New York, U. S. A. (Not yet accepted.)

157,181 Pressure gage for tires. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, N. Y., assignee of W. P. Hammond, 159 Lexington avenue, Passaic, N. J.—both in U. S. A. (Not yet accepted.)

157,182 Nut for use on the valve stem of a pneumatic tire. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, assignee of M. C. Schweinert, 42 Riverside Drive, New York—both in New York, U. S. A. (Not yet accepted.)

157,183 Tire valve. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, N. Y., assignee of M. C. Schweinert, 42 Riverside Drive, New York, and H. P. Kraft, 219 Godwin avenue, Ridgewood, N. J.—both in U. S. A. (Not yet accepted.)

157,184 Tire valve. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, N. Y., assignee of M. C. Schweinert, 42 Riverside Drive, New York, and H. P. Kraft, 219 Godwin avenue, Ridgewood, N. J.—both in U. S. A. (Not yet accepted.)

157,185 Dust cap for tire valve. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, N. Y., assignee of E. van A. Myers, 77 Evergreen Place, East Orange, N. J.—both in U. S. A. (Not yet accepted.)

157,186 Dust cap for tire. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, N. Y., assignee of E. van A. Myers, 77 Evergreen Place, East Orange, N. J.—both in U. S. A. (Not yet accepted.)

157,187 Tire valve. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, N. Y., assignee of J. A. Bowden, 2357 West 23rd street, Los Angeles, Calif.—both in U. S. A. (Not yet accepted.)

157,188 Dust-caps for tire valves, etc. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, N. Y., assignee of E. van A. Myers, 77 Evergreen Place, East Orange, N. J.—both in U. S. A. (Not yet accepted.)

157,189 Valve for fire-extinguishers. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, assignee of M. C. Schweinert, 42 Riverside Drive, New York—both in New York, U. S. A. (Not yet accepted.)

157,190 Dust cap for tire valve. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, N. Y., assignee of E. van A. Myers, 77 Evergreen Place, East Orange, N. J.—both in U. S. A. (Not yet accepted.)

157,191 Dust cap for tire valve. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, assignee of M. C. Schweinert, 42 Riverside Drive, New York—both in New York, U. S. A. (Not yet accepted.)

157,192 Tire valve. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, assignee of M. C. Schweinert, 42 Riverside Drive, New York—both in New York, U. S. A. (Not yet accepted.)

157,193 Pneumatic tire gage. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, assignee of M. C. Schweinert, 42 Riverside Drive, New York—both in New York, U. S. A. (Not yet accepted.)

157,256 Artificial limb joint with rubber ring. F. Weis, 31 Schonburgstrasse, Vienna. (Not yet accepted.)

157,259 Artificial leg with rubber cushion in ankle. A. Habermann, 24 Dreimuhlenstrasse, Munich, Germany. (Not yet accepted.)

157,276 Dirigible balloon. O. Ebersbach, 11 Spessartstrasse, Wilmersdorf, Berlin. (Not yet accepted.)

157,315 Corset with elastic inner side strips. S. J. Newman, New Haven, Conn., U. S. A. (Not yet accepted.)

PUBLISHED MARCH 31, 1921

157,524 Spring wheel with continuous outer rigid ring and pneumatic cushions. F. W. Lanchester, 41 Bedford square, London.

157,530 Detachable rim for tires. J. W. Foley, 71 Woodland Road, Handsworth, Birmingham.

157,540 Pneumatic tire. J. Watson, Middle street, North, Driffield, Yorkshire.

157,568 Pneumatic tire. R. R. à C. Beadon, Dufferin Hospitals, Agra, India.

157,646 Solid or pneumatic tires with one or two splash-preventing collars on the tread side. A. Thorn, 22 St. George's Road, Forest Gate, London.

157,673 Protecting sheet rubber in storage. J. Y. Johnson, 47 Lincoln's Inn Fields, London. (Diamond State Fibre Co., Bridgeport, Pa., U. S. A.)

PUBLISHED APRIL 6, 1921

157,698 Repair patch for rubber boots, etc. J. Robertson, 472 Gregory avenue, Wechawken, New Jersey, U. S. A.

PUBLISHED APRIL 13, 1921

158,131 Fiber and rubber composition soles. H. Armstrong, 34 King street, West, Manchester.

158,181 Wire fabric belts having meshes filled with dough of rubber and paper pulp, and built up in layers separated by rubber, flax, canvas or cotton fabric, connected by pressure and covered with vulcanized rubber. A. T. Edwards, 109 Loop street, Cape Town, South Africa.

158,347 Squeegee for cleaning interior of jars, etc. J. R. Barrett, 46 Knighton Park Road, Sydenham, London.

158,352 Reinforced pneumatic tire. H. H. Summers, 28 Cheapside, London.

158,501 Sock suspenders. J. Patterson, 21 Wellington street, Aldershot.

PUBLISHED APRIL 20, 1921

158,551 Pneumatic cushioned vehicle suspension. A. Joel & Co., 68 Hardturmstrasse, Zürich, Switzerland. (Not yet accepted.)

158,656 Rubber studs externally applied to boot soles. E. Clarke, Easemore Road, Redditch.

158,676 Rubber protectors for boot soles. E. Mote, 18 Carter street, Higher Broughton, Manchester.

158,678 Resilient tire with soft rubber core. G. W. Bell, 121 Alexandrine avenue, West Detroit, Mich., U. S. A.

158,691 Improved valve closure for laceless footballs. G. C. Hunter, 93 St. Leonard street, Sunderland.

158,861 Oil-proof rubber and wire fabric piston packing. C. C. Farmer, 132 Hawthorn street, Edgewood, Pennsylvania, U. S. A. (Not yet accepted.)

158,862 Oil-proof rubber and fabric piston packing. H. C. Loudenbeck, care Westinghouse Air Brake Co., Wilmerding, Pennsylvania, U. S. A. (Not yet accepted.)

PUBLISHED APRIL 27, 1921

158,963 Pneumatic tire with tubular metal core and rubber tread. H. E. G. Bateman and L. C. Bateman, 18 Western Broadway, Hammersmith, London.

159,000 Rubber device for use in practising golf strokes. J. D. Edgar, 29 Bowsden Terrace, Gosforth, Newcastle-on-Tyne.

159,044 Adjustable elastic connection between gramophone stylus bar and needle. M. J. M. Bryan, Cambridge House, Nether street, Church End, Finchley, London.

159,046 Tubular rubber eye-pieces for eye-glasses. J. E. Godwin, 87 Esme Road, Sparkhill, Birmingham.

159,284 Pneumatic cord tire. H. T. S. McClintock, Dreghorn, Dalkey C. I. Moore, Llandaff Hall, Merrion Road; and J. Callaghan, Sandringham, Leeson Park—all in County Dublin, representatives of J. B. Dunlop.

159,287 Pneumatic tire pressure gage and valve. J. E. Graham, The Châlet, Gipsy Lane, Putney, London.

GERMANY

PATENTS ISSUED, WITH DATES OF ISSUE

336,035 (May 8, 1920.) Extensible grooved belt. Opel-Automobile Verkaufsgesellschaft m. b. H. Frankfort-on-the-Main.

337,240 (September 23, 1920.) Hollow rubber article with pipe. Vereinigte Gummiwaaren-Fabriken-Wien, formerly Menier-J. N. Reithoffer, Harburg, Elbe.

337,272 (September 18, 1920.) Tube for vulcanizing rubber tires. Smith One-Heat System, South Bend, Ind., U. S. A.; represented by G. Sachse, Berlin, S. W. 61.

NEW ZEALAND

PUBLISHED MARCH 10, 1921

44,418 Benzine, etc., container closure-device. Dunlop Rubber Co. of Australasia, Limited, 108 Flinders street, Melbourne, assignee of F. O. Wolff, 27 Kasouka road, East Camberwell—both in Victoria.

44,900 Milking-machine measuring can fitted with rubber tube. R. Preston, Manutuke, Gisborne, N. Z.

44,962 Resilient tire. D. Maggiora, Firenze, Careggi, Italy.

PUBLISHED MARCH 24, 1921

43,404 Round rubber heel. J. E. Thrower, 79 Wellesley street, West, Auckland, N. Z.

45,065 Pneumatic tire made of laminated rubber strips and impregnated threads of silk. John Brown, Herald Buildings, Auckland, N. Z.

PUBLISHED APRIL 7, 1921

43,442 Milking machine teat-cup. D. F. Watson, Waitoa, Thames Line, Auckland, N. Z.

44,875 Milking machine teat-cup. C. H. Davis, Ridgeway street, Wanganui, N. Z.

TRADE MARKS

THE UNITED STATES

SERIAL NUMBERS PUBLISHED APRIL 5, 1921*

NO. 123,974 The words SHIP BY TRUCK within a circle—tires and tubes. Firestone Tire & Rubber Co., Akron, Ohio.

124,276 Representation of a hoof and hoof-print of an animal within a circle—tires and tubes. The Marathon Tire & Rubber Co., Cuyahoga Falls, Ohio.

136,752 The word HYCO—rubber and shoe knives, knives with extension blades and handles, etc. Hyde Manufacturing Co., Southbridge, Mass.

139,254 Conventionalized shield in red bearing the monogram DMTCO—tires. The Denman-Myers Cord Tire Co., Cleveland, Ohio.

142,974 DIAMOND—tires, tubes, tire patches and sleeves, reliners, etc. The B. F. Goodrich Co., New York, N. Y.

SERIAL NUMBERS PUBLISHED APRIL 9, 1921*

124,278 ANGLE TREAD—tires and tubes. The Marathon T re & Rubber Co., Cuyahoga Falls, Ohio.

126,550 SANAS—sanitary aprons for small children. A. M. M. White, Elmhurst, N. Y.

134,446 The words RAYNGARD and WEATHER PROOF within an oval outline—waterproof and weatherproof coats. United States Rubber Co., New Brunswick, N. J., and New York, N. Y.

139,204 CREST BRAND FILENES combined with a conventionalized fleur-de-lis and wreath—shoes of rubber fabric, combinations, etc. Wm. Filene's Sons Co., Boston, Mass.

139,850 COLLINS' RAPPID-SEALER and portrait of registrant within representation of a tire—tire repair composition. G. W. Collins, Wilmington, Del.

SERIAL NUMBERS PUBLISHED APRIL 15, 1921*

128,577 THREE POINT—golf balls. The Worthington Ball Co., Elyria, Ohio.

137,115 LATITE—rubber door-mats and bath-mats. George W. Eno Rubber Co., Los Angeles, Calif.

140,099 WEDCO within a diamond outline—tire fabrics, ducks, drills, osnaburgs, etc. W. W. Edelstone, Cambridge, Mass.

141,901 ISLAND CHICLE—gum used in the manufacture of chewing gum. L. A. Dreyfus Co., New York, N. Y.

142,101 GRANITE tires. Revere Rubber Co., Providence, R. I.

142,566 OMO, with a pair of wings springing from top points of the letter M—elastic webbing, cord, braid and dress-belting. The Omo Manufacturing Co., Middletown, Conn.

142,953 BULL DOG—tires, tubes and casings. Braender Rubber & Tire Co., Rutherford, N. J.

142,975 GOODRICH—rubber bands. The B. F. Goodrich Co., New York, N. Y.

143,298 RACINE COUNTRY ROAD—tires and tubes. Racine Rubber Co., Racine, Wis.

SERIAL NUMBERS PUBLISHED APRIL 23, 1921*

130,492 MULTI-MILE—tires and tubes. Racine Rubber Co., Racine, Wis.

137,550 VACUUM inside double oval outline—all kinds of leather, fiber, rubber, textile and composition belting. Vacuum Belting Co., Indianapolis, Ind.

142,018 RED CIRCLE on representation of tire enclosing the words OUR DADDY'S CHOICE, and the heads and shoulders of a girl and boy—sheet rubber patches. The Jones & Jones Co., Kingman, Kans.

SERIAL NUMBERS PUBLISHED MAY 3, 1921*

123,995 Representation of a pair of hands adjusting sections of tire rim on a tire—solid resilient inner tubing. J. T. McMahon, Kansas City, Mo.

126,107 Representation of tire having black tread separated from gray or white sidewalls by narrow red band or bands—tires. The Dayton Rubber Manufacturing Co., Dayton, Ohio.

136,108 KOLOYDO—pigment. E. M. & F. Waldo, New York, N. Y.

137,116 INSO—rubber-coated fabric inner tubes for relining pneumatic tire casings. George W. Eno Rubber Co., Los Angeles, Calif.

137,117 EXSO—retreads for attachment to the outer surfaces of worn pneumatic tire casings. George W. Eno Rubber Co., Los Angeles, Calif. (THE INDIA RUBBER WORLD, October 1, 1920, page 36.)

137,343 PIGMENT ACCELERATOR No. 23—chemical used in the manufacture of rubber. E. M. & F. Waldo, New York, N. Y.

137,344 SAPOFOR—pigment. E. M. & F. Waldo, New York, N. Y.

138,300 DIXIE—suspenders, garters, armbands and belts. The Ohio Suspender Co., Mansfield, Ohio.

140,542 The words CINCY COMFORTS, the letter C forming the first letter of both words—shoes made of leather, rubber or fabric and their combinations. The Queen City Turn Shoe Co., Cincinnati, Ohio.

140,674 TRU-ARCH—women's, men's and children's boots, shoes and slippers of leather, rubber, etc. Thomas G. Plant Co., Boston, Mass.

140,675 ARCH DEVELOPER—men's, women's and children's boots, shoes and slippers of leather, rubber, etc. Thomas G. Plant Co., Boston, Mass.

140,676 ARCH COMBINATION—men's, women's and children's boots, shoes and slippers of leather, rubber, etc. Thomas G. Plant, Boston, Mass.

*Notice of opposition must be filed with the Commissioner of Patents, Washington, D. C., within thirty days after this date.

141,875 NORTHLAND—rubber boots, caps, coats, hats, hoods, overshoes, raincoats, sandals, trousers, gloves and overcoats. F. A. Patrick & Co., Duluth, Minn.

143,981 CLECKTA—leather and balata belting. Henry F. Cockill & Sons, Limited, Whitcliffe, Cleckheaton, England.

144,131 F-S—tires. Cupples Company, Manufacturers, St. Louis, Mo.

144,166 Representation of a globe surrounded by a belt bearing the word GLOBESTOS—brake linings. United & Globe Rubber Co., Trenton, N. J.

TWO KINDS OF TRADE MARKS NOW BEING REGISTERED

Under the rules of the United States Patent Office, trade marks registered under the Act of February 20, 1905, are, in general, fanciful and arbitrary marks, while those registered under the Act of March 19, 1920, Section 1 (b), are non-technical, that is, marks consisting of descriptive or geographical matter or mere surnames. To be registered under the latter act, trade marks must have been used for not less than one year. Marks registered under this act are being published for the first time when registered, any opposition taking the form of an application for cancellation.

GRANTED MARCH 29, 1921

Under Act of February 20, 1905

140,804 FIRESTONE—tires, inner tubes and accessories. Firestone Tire & Rubber Co., Akron, O.

140,811 GRAINVEY—fabric and rubber elevator belts. The B. F. Goodrich Co., New York, N. Y.

140,812 ORION—fabric and rubber belts. The B. F. Goodrich Co., New York, N. Y.

140,818 Section of orange-and-black striped white hose—rubber-lined fabric hose. The Gutta Percha & Rubber Manufacturing Co., New York, N. Y.

140,847 OILTITE—rubber packing. Jenkins Rubber Co., assignor to Jenkins Bros.—both of Elizabeth, N. J.

140,848 OUR DADDY'S CHOICE—tire patches. The Jones & Jones Co., Kingman, Kans.

140,859 KLEINERT'S—rubber aprons, sanitary baby goods, ear muffs, pantalettes and bloomers. I. B. Kleinert Rubber Co., New York, N. Y.

140,860 KIDDIE—baby pants. I. B. Kleinert Rubber Co., New York, N. Y.

140,874 LION'S PAW—tires and tire patches. Loeser & Sons, Terre Haute, Ind.

140,888 REVERSETTE—rubber coats. W. MacPherson, Cambridge, Mass.

140,894 HERRINGBONE—canvas fabric and rubber machinery packings. N. B. Miller, New York, N. Y.

140,899 MONEY BACK—tire tubes, patches, casing patches and patch kits. Money Back Laboratories, Inc., Oklahoma, Okla.

140,900 Man with patched trousers holding tire, etc.—tire tubes, patches, casing patches and patch kits. Money Back Laboratories, Inc., Oklahoma, Okla.

140,901 MONEY BACK and man with patched trousers holding tire, etc.—tire tubes, patches, casing patches and patch kits. Money Back Laboratories, Inc., Oklahoma, Okla.

140,944 RAMO TIRES—pneumatic tire shoes and inner tubes. Ramo Tire & Rubber Co., Pittsburgh, Pa.

140,979 HYDROKIT—hydrometer apparatus. Steiner Manufacturing Co., Long Island City, N. Y.

141,012 MILLRITE—leather, rubber and composition belting. Wayne Belting & Supply Co., Fort Wayne, Ind.

Under Act of March 19, 1920, Section 1 (b)

141,029 BERGOUGNAN—rubber tires. Bergougnan Rubber Corporation, Wilmington, Del., and Trenton, N. J.

141,049 SPRAGUE—inner tubes and cord and fabric tires. Sprague Tire & Rubber Co., Omaha, Neb.

GRANTED APRIL 5, 1921

Under Act of February 20, 1905

141,056 ROMANJO—automobile and truck tires and inner tubes. Romanjo Tire Co., Chicago, Ill.

GRANTED APRIL 12, 1921

Under Act of February 20, 1905

141,105 OURBESTOS—brake lining. Cumings Brothers, Flint, Mich.

141,118 ARTCRAFT—fountain pens. Edison-Cromer Pen Co., Birmingham, Ala.

141,120 CATALFO—purified colloidal clay. W. Feldenheimer, London, Eng.

141,145 INTERLOCKED PRODUCTS—belting, hose, and machinery packing. Imperial Belting Co., Chicago, Ill.

141,154 MASTER—tire patch. W. C. Knott, Shreveport, La.

141,194 RED LINE—tires, tubes, inner linings and accessories. C. Palmer, Grand Rapids, Mich.

141,209 A kangaroo within a tire—rubber and rubber and fabric tires and inner tubes. Quick Tire Service, Inc., New York, N. Y.

141,273 NEURO-PATHO—rubber heels. F. W. Willis, Kansas City, Mo.

141,274 HI-STEPPER—rubber heels. F. W. Willis, Kansas City, Mo.

GRANTED APRIL 19, 1921

Under Act of February 20, 1905

141,309 ADAMS MEXICAN FRUIT CHEWING GUM—chewing gum. American Chicle Co., New York, N. Y.

141,347 TOOTH EXERCISE GUM—chewing gum. D. M. Dickinson, Jr., Detroit, Mich.

141,445 PACEMAKER—rubber heels and lifts. Tee Pee Rubber Co., New York, N. Y.

141,452 GLOBETT—rubber and fabric belts. United & Globe Rubber Co., Trenton, N. J.

GRANTED APRIL 26, 1921

Under Act of February 20, 1905

141,474 ADAMS KISS-ME—chewing gum. American Chicle Co., New York, N. Y.

141,511 C. C. C.—tires, tubes, inner liners and blow-out patches. C. C. C. Fire Hose Co., Canton, Mass.

141,515 1885 ELECTRICAL WIRES AND CABLES—insulated wire and cables. Chicago Insulated Wire & Manufacturing Co., Sycamore, Ill.

141,534 PIRODENT—chewing gum. D. M. Dickinson, Jr., Detroit, Mich.
141,545 THE EXCELSIOR SHOE—boots and shoes of leather, rubber, canvas, fabric and combinations. The Excelsior Shoe Co., Portsmouth, O.
141,562 GO-RU-CO.—waterproof boots with leather tops and knit wool gaiters. The B. F. Goodrich Co., New York, N. Y.
141,601 FLEXYDE—leather, fabric or rubber belts for supporting outer garments. The Marathon Tire & Rubber Co., Cuyahoga Falls, O. (See description elsewhere in this issue.)
141,617 MORE-GRIP SELF-VULCANIZING PATCH—tire and tube patches. V. V. Moore, Cordele, Ga.
141,645 RAY PUNCTURE-PROOF INTERLINERS FOR PNEUMATIC TIRE CASINGS PROTECT THE MOTORING WORLD—tires and interliners. Ray Tire & Rubber Co., Chicago, Ill.
141,650 POLLY BRAND SPEAKS FOR ITSELF—garters and hose supporters. The Russell Manufacturing Co., Middletown, Conn.
141,673 SERV-US—fruit-jar rings. Serv-Us Grocery Products Corporation, New York, N. Y.

Under Act of March 19, 1920, Section 1 (b)

141,733 ARCHEASE—canvas rubber-soled shoes. The Beacon Falls Rubber Shoe Co., Beacon Falls, Conn.
141,700 GOLD MEDAL—tires and tubes. Newman Tire & Rubber Co., Inc., New York, N. Y.
141,812 COLUMBIA and the monogram TRCO on representation of a rubber heel—rubber heels. Taunton Rubber Co., Inc., Taunton, Mass.
141,813 TAYLOR—hygrometers, thermometers, etc., for industrial and domestic use. Taylor Instrument Companies, Rochester, N. Y.

THE DOMINION OF CANADA

REGISTERED

28,155 Go-Ru-Co within a panel-shaped figure—waterproof clothing and footwear. The B. F. Goodrich Co., New York, U. S. A.
28,207 COUNTRY CLUB PARLOR GOLF GAME—parlor golf games. F. D. McLaren, Calgary, Alta.
28,289 VENUS above representation of Venus de Milo—erasers, rubber bands, etc. American Lead Pencil Co., New York, U. S. A.
28,291 THE CLIMATIC RAINCOAT. A SHIELD FOR ALL WEATHERS—waterproofs. Northcote, Brewer & Co., Limited, 27 York street, Manchester, County of Lancaster, Eng.

THE UNITED KINGDOM

PUBLISHED MARCH 2, 1921

400,491 AURORA and representation of a sunrise—dental rubber, etc. The International Tooth Co., Limited, 24 to 28 Grafton House, Golden Square, London, W. 1.
403,701 DUNLOP—tire inflators. The Dunlop Rubber Co., Limited, Dunlop House, 1 Albany street, Regent's Park, London, N. W. 1.
403,702 DUNLOP—metal rims for wheels of cycles and motorcycles. The Dunlop Rubber Co., Limited, Dunlop House, 1 Albany street, Regent's Park, London, N. W. 1.
403,703 DUNLOP—golf balls. The Dunlop Rubber Co., Limited, Dunlop House, 1 Albany street, Regent's Park, London, N. W. 1. (Advertised before acceptance, the applicant alleging distinctiveness.)
403,704 DUNLOP—repair outfits for tires and bags of textile material for spare tires and tubes. The Dunlop Rubber Co., Limited, Dunlop House, 1 Albany street, Regent's Park, London, N. W. 1. (Advertised before acceptance, the applicant alleging distinctiveness.)
406,983 DUNLOP—metal tire levers. The Dunlop Rubber Co., Limited, Dunlop House, 1 Albany street, Regent's Park, London, London, N. W. 1.
407,799 DUNLOP—lifting jacks. The Dunlop Rubber Co., Limited, Dunlop House, 1 Albany street, Regent's Park, London, N. W. 1.
410,190 PERMAGRIP—manufactured rubber and gutta percha goods not included in classes other than No. 40. Freston, Hull & Co., Limited, Proprietors of the Coal By-Products Co., 112 High Holborn, London, W. C. 1.
410,746 PARODA—Paddings for airplanes, made principally of rubber. Siebe, Gorman & Co., Limited, 187 Westminster Bridge Road, London, S. E. 1.

PUBLISHED MARCH 9, 1921

411,097 MACKINPROOF—all rubber and other goods included in Class No. 40. Anderson, Anderson & Anderson, Limited, 35 St. Paul's Churchyard, London, E. C. 4.
411,099 WATERTOSH—all rubber and other goods included in Class No. 40. Anderson, Anderson and Anderson, Limited, 35 St. Paul's Churchyard, London, E. C. 4.
411,206 THE RABBIT—golf balls and all golf requisites. A. C. B. Bell, 17 Lansdowne Crescent, Edinburgh.
411,305 NOBEL INDUSTRIES LIMITED—TRADE MARK around edge of representation of a seal having in the center a picture of one active and one inactive volcano—manufactured rubber and gutta percha goods not included in classes other than No. 40. Nobel Industries Limited, 220 Winchester House, Old Broad street, London, E. C. 2.

PUBLISHED MARCH 16, 1921

410,191 PERMAGRIP—repairing outfits included in Class No. 50, for rubber tires, boots, etc. Preston, Hull & Co., Limited, proprietors of the Coal By-Products Co., 112 High Holborn, London, W. C. 1.
410,702 OCTOPUS BRAND and representation of an octopus—machinery belting of rubber or chiefly of rubber. Wallach Bros., Limited, 49 Tabernacle street, Finsbury Square, London, E. C. 2.
411,210 The word GANDY below the representation of a roll of belting—machinery belting of balata or in which balata predominates. The Gandy Belt Manufacturing Co., Limited, Wheatland Works, Wheatland Lane, Seacombe, County of Chester.
411,352 INGOT—druggists' and surgical rubber sundries. Ford, Cook & Co., Limited, 6 Wall street, London, E. C. 1.

PUBLISHED MARCH 23, 1921

B409,368 A diamond outline containing a monogram composed of a reversed D and the letter B joined—rubber working machinery, etc. David Bridge & Co., Limited, Castleton Iron Works, John street, Castleton, Lancashire.
410,232 DRAGON SPRING GARTER and the representation of a dragon—garters. The Heath Spring & Notion Co., Limited, St. George's Works, Birchfield Road, Headless Cross, near Redditch, Worcestershire.
411,187 BAHCID—cushions made principally of rubber. A. F. E. de St. Dalmas, Tacotena, Lansdown Road, Sidcup, Kent.
411,967 NALLOG—All rubber and other goods included in Class 40. Hector Gollan & Son, Limited, 130 Trongate, Glasgow.

PUBLISHED MARCH 30, 1921

409,593 Representation of label bearing the word FLINTOS, above the words MADE IN CANADA—rubber and fabric footwear made in Canada. Canadian Consolidated Rubber Co., Limited, 201 Inspector street, Montreal, Que., Can. Address for service in the United Kingdom, care of Haseltine, Lake & Co., 28 Southampton Buildings, London, W. C. 2.
B410,918 "WATERMAN"—fountain pens. L. E. Waterman Co., 191 Broadway, New York, U. S. A. Address for service in the United Kingdom care of A. M. & W. Clark, 53 and 54 Chancery Lane, London, W. C. 2.
412,240 SPARTAN—rebuilt or reconstructed pneumatic tires. The Welch Standard Tyre & Rubber Co., Limited, 1 Snells Park, Edmonton, London, N. 18.

PUBLISHED APRIL 6, 1921

B410,916 "WATERMAN'S IDEAL"—fountain pens included in Class No. 39. L. E. Waterman Co., 191 Broadway, New York, U. S. A. Address for service in the United Kingdom care of A. M. & W. Clark, 53 and 54 Chancery Lane, London, W. C. 2.
411,439 The words JUNIPERUS above and VIRGINIANA below the representation of a juniper tree within an elipse—ink and pencil erasers, etc. F. Chambers & Co., Limited, The Garden Pencil Works, Derby Road, Stapleford, Nottinghamshire.

PUBLISHED APRIL 13, 1921

B409,997 CAMBRIDGE—tires of rubber or in which rubber predominates. The Dunlop Rubber Co., Limited, Dunlop House, 1 Albany street, Regent's Park, London, N. W. 1. (Evidence has been supplied that the mark is in fact capable of distinguishing the goods.)
411,055 ETCO—rubber goods except tires, etc., included in Class No. 40. George Allen Stetson, trading as The Elastic Tip Co., 370 Atlantic Avenue, Boston, Massachusetts, U. S. A. Address for service in the United Kingdom care of Sefton-Jones, O'Dell & Stephens, 285 High Holborn, London, W. C. 1.

PUBLISHED APRIL 20, 1921

408,586 ADAMS' SPEARMINT CHEWING GUM on a representation of label—spearmint chewing gum. Adams & Beemans, Limited, 89 Great Eastern street, London, E. C. 2.
B409,996 EDINBURGH—tires of rubber or in which rubber predominates. The Dunlop Rubber Co., Limited, Dunlop House, 1 Albany Street, Regent's Park, London, N. W. 1. (Evidence has been supplied that the mark is in fact capable of distinguishing the goods).

PUBLISHED APRIL 27, 1921

402,883 ROCKBESTOS—asbestos yarn, electrical insulation material, etc. Marlin-Rockwell Corporation, 347 Madison Avenue, New York, U. S. A. Address for service in the United Kingdom care of Marks and Clerk, 57 and 58 Lincoln's Inn Fields, London, W. C. 2.
409,801 UM—appliance of steel and rubber for supporting or holding golf clubs, billiard cues, walking sticks, etc. M. V. Farey, 8A, Wellington Mansions, Queen's Club Gardens, West Kensington, London, W. 14.
411,096 MACKINPROOF—rubber-proofed garments. Anderson, Anderson & Anderson, Limited, 35 St. Paul's Churchyard, London, E. C. 4.
411,526 DALCO—rubber heels and soles for boots and shoes. Davies, Lord & Co., Limited, 21 Anchor street, Southport.
412,677 INCA—pads for boots and shoes, made of rubber or having rubber predominating. Blakely's Boot Protectors, Limited, Armley Malleable Ironworks, Modder Place, Armley, Leeds.
411,743 PERSO—suspenders, garters, brace ends and elastic armbands. Samuel Belman, trading as S. Belman & Co., 73 Pershore street, Birmingham, Warwickshire.
412,731 CLARUS—rubber stamps and inking pads. John T. Clarke & Son, Limited, 30 Charles street, Oxford Road, Manchester.
B412,905 WATERMAN—fountain pens. L. E. Waterman Co., 191 Broadway, New York, U. S. A. Address for service in the United Kingdom care of A. M. & W. Clark, 53 and 54 Chancery Lane, London, W. C. 2.
B412,907 WATERMAN'S IDEAL—fountain pens. L. E. Waterman Co., 191 Broadway, New York, U. S. A. Address for service in the United Kingdom care of A. M. & W. Clark, 53 and 54 Chancery Lane, London, W. C. 2.

NEW ZEALAND

PUBLISHED MARCH 10, 1921

16,521 GEMCO—tire display stands, foot-pedal extensions, tire-holders, etc. Gemco Manufacturing Co., 742 South Pierce street, Milwaukee, Wis., U. S. A.
17,246 SAFETEE—toilet articles, including folding shaving brushes having bristles set in hard rubber. Safetee Soap Corporation, 305 Jay street, Brooklyn, New York, U. S. A.
17,686 AJAX ROAD KING—automobile and bicycle tires, casings, inner tubes, patches and cement. Ajax Rubber Co., Inc., Millbrook, Dutchess County, New York, U. S. A.

PUBLISHED APRIL 7, 1921

17,573 ANCHOR RUBBER Co. on representation of seal bearing an anchor, and having border composed of conventionalized rope—rubber footwear, particularly overshoes. Canadian Consolidated Rubber Co., Limited, 201 Inspector street, Montreal, Quebec, Can.

17,735 RUBBADUNDUB—inflatable rubber toys. J. G. Franklin & Sons, Limited, 17 Colvestane Crescent, Dalston, London, E. 8, Eng. (See THE INDIA RUBBER WORLD, April 1, 1921, page 504.)

DESIGNS

THE UNITED STATES

NO. 57,431 Tire. Patented March 29, 1921. Term 14 years. M. Greenspan, Chicago, Ill.

57,461 Tire casing. Patented April 5, 1921. Term 14 years. F. H. Brewster, assignor to Madison Tire & Rubber Co., Inc.—both of Buffalo, N. Y.

57,480 Tire. Patented April 5, 1921. Term 14 years. C. F. Ofensend, assignor to The Miller Rubber Co.—both of Akron, O.

57,490 Tire casing. Patented April 12, 1921. Term 3½ years. R. D. Belden, Marion, O.

57,491 Tire casing. Patented April 12, 1921. Term 3½ years. R. D. Belden, Marion, O.

57,527 Respirator mask. Patented April 12, 1921. Term 7 years. J. W. Knoblock, assignor to American-LaFrance Fire Engine Co., Inc.—both of Elmira, N. Y.

57,528 Respirator. Patented April 12, 1921. Term 7 years. J. W. Knoblock, assignor to American-LaFrance Fire Engine Co., Inc.—both of Elmira, N. Y.

57,566 Tire. Patented April 26, 1921. Term 14 years. J. M. Alderfer, Akron, O.

57,571 Tire. Patented April 26, 1921. Term 14 years. A. Balthazar, Chicopee Falls, and M. R. Shaw, Springfield, assignors to The Fisk Rubber Co., Chicopee Falls—both in Mass.

57,628 Beard softener. Patented April 26, 1921. Term 3½ years. C. S. Finney, Chicago, Ill.

57,637 Tire. Patented April 26, 1921. Term 14 years. R. P. Gourley, Springfield, and H. P. Partenheimer, Chicopee Falls, assignors to The Fisk Rubber Co., Chicopee Falls—both in Mass.

57,639 Cap for tire valves. Patented April 26, 1921. Term 7 years. P. J. Griffin, Boston, Mass.

57,642 Bathing cap. Patented April 26, 1921. Term 14 years. G. K. Guinzburg, assignor to I. B. Kleinert Rubber Co.—both of New York, N. Y.

57,654 Tire placer. Patented April 26, 1921. Term 3½ years. C. A. Hornburg, Waco, Tex.

57,663 Tire. Patented April 26, 1921. Term 14 years. J. P. Kirch, Pittsburgh, Pa.

57,664 Tire. Patented April 26, 1921. Term 14 years. J. P. Kirch, Pittsburgh, Pa.

57,665 Tire. Patented April 26, 1921. Term 14 years. J. P. Kirch, Pittsburgh, Pa.

57,666 Tire. Patented April 26, 1921. Term 14 years. J. P. Kirch, Pittsburgh, Pa.

57,667 Tire. Patented April 26, 1921. Term 14 years. J. P. Kirch, Pittsburgh, Pa.

57,480 57,667 57,666 57,637 57,664 57,663 57,566 57,665 57,668 57,669 57,670 57,671

57,578 57,491 57,490 57,431 57,732 57,745 57,631 57,709 57,741 57,731

57,668 Tire. Patented April 26, 1921. Term 14 years. J. P. Kirch, Pittsburgh, Pa.

57,669 Tire. Patented April 26, 1921. Term 14 years. J. P. Kirch, Pittsburgh, Pa.

57,670 Tire. Patented April 26, 1921. Term 14 years. J. P. Kirch, Pittsburgh, Pa.

57,671 Tire. Patented April 26, 1921. Term 14 years. J. P. Kirch, Pittsburgh, Pa.

57,725 Automobile wheel for pneumatic tires. Patented April 26, 1921. Term 7 years. F. Richard, Cleveland, O.

57,731 Tire. Patented April 26, 1921. Term 7 years. E. Yockey, Milwaukee, Wis.

57,732 Tire. Patented April 26, 1921. Term 14 years. F. E. Shannon, Akron, O.

57,743 Heel. Patented April 26, 1921. Term 14 years. H. G. Swarr, Lancaster, assignor to Armstrong Cork Co., Pittsburgh—both in Pa.

57,745 Tire tread. Patented April 26, 1921. Term 14 years. A. C. Terrell, Kansas City, Mo.

GERMANY

DESIGN PATENTS ISSUED WITH DATES OF ISSUE

769,629 (February 10, 1921.) Arrangement of inserts of steel plates in round and ordinary rubber heels, as well as soles, to insure better attachment to the footwear. Heinrich Firis, Schwanthalerstrasse 5, Munich.

769,672 (November 23, 1920.) Exchangeable rubber heel which is to be attached to an iron plate to be nailed onto the shoe heel. Konrad Volz, Schönebeckerstrasse 130, Bremen.

769,674 (December 2, 1920.) Rubber to bite into to protect the tongue in cases of attacks of cramp. Robert Wolf, Winkelsfelderstrasse 106, Düsseldorf.

770,021 (February 14, 1921.) Insert of rubber strip for garters. Arthur Liebscher, Hübnerstrasse 21, Dresden.

770,454 (February 7, 1921.) Garter of pure strip rubber. Jakob Braun, Zülpicherstrasse 209, Köln-Sülz.

770,553 (December 17, 1920.) Syringe with piston stopper. George Hasse, Andreas-strasse 21, Berlin.

770,733 (January 29, 1921.) Bed inlay. Mittelland Gummiwerke A. G., Hannover-Linden.

770,741 (February 7, 1921.) Rubber sole. Hessische Gummiwarenfabrik Fritz Peter, Klein Anheim on Main.

770,971 (November 27, 1920.) Heel of rubber or other material. Richard Anhäuser, Turnerstrasse 97, Stettin.

771,015 (February 19, 1921.) Rubber sole. Hannoversche Gummi Regenerierwerke Luttermann & Co., G. m. b. H., Wunstorf.

771,083 (February 15, 1921.) Rubber heel. Rheinische Gummi-und Celluloidfabrik, Mannheim-Neckarau.

771,262 (February 21, 1921.) Collapsible surgical syringe. Akt. Ges. für Feinmechanik, formerly Jetter & Scheerer, Tuttlingen.

771,536 (February 26, 1921.) Pocket inhaling apparatus. Bernhard Rochocz, Rödelstrasse 7, Leipzig-Schleussig.

771,588 (January 12, 1921.) Hygienic douche. Heinrich Bind, Mundenheimstrasse 254, Ludwigshafen on the Rhein.

771,599 (February 2, 1921.) Rubber plate with support of reinforced webbing. Friedrich Theilmann, Waldstrasse 54, Frankfort on the Main-Niederrad.

771,777 (March 1, 1921.) Rubber water bottle. Continental-Caoutchouc und Gutta-Percha-Compagnie, Hannover.

771,819 (March 8, 1920.) Non-skid device for solid twin tires on trucks. H. E. Köhn, Stralsund.

771,978 (September 30, 1920.) Intrauterine pessary. Reischach & Co., G. m. b. H., Berlin.

772,086. (February 10, 1921.) Sanitary band. Wilhelm Roescheisen, Zinglerstrasse 22, Ulm.

772,312 (February 26, 1921.) Dental air-blower. Breslauer Gummiwaren-Manufaktur Rudolf Woitscheck, Breslau.

772,545 (March 5, 1921.) Tire protector. Karl Hahn, Hohenstaufenstrasse 6, Frankfort-on-the-Main.

772,649 (October 22, 1920.) Rupture band. Charles Cluthe, Sr., Mainluststrasse 9, Frankfort-on-the-Main.

772,735 (January 29, 1921.) Alcohol container for injection syringes having fastening consisting of a conical stopper of asbestos, rubber or similar material. Wilhelm Heinrich Gerhard van der Ven, Rees.

772,807 (November 11, 1920.) Rubber nipple stopper for nursing bottles. August Richter, Bühlau near Dresden.

772,842 (March 5, 1921.) Rubber sole. Wilhelm G. Rudolph, Frankfort on the Main.

772,883 (March 9, 1920.) Elastic tire with hollow and level fellies. Hermann Strach, Witteringstrasse 61, Essen-Ruhr.

773,560 (March 16, 1921). Rubber heel. Ernst Karl, Hoheluftchauffee 129, Hamburg.

773,582 (December 11, 1920.) Packing for rubber heels. Schwelmer Gummiwaren-Gesellschaft, Schwelm i. W.

774,052 (November 18, 1920).) Rubber sole with leather insert. Simon Seelig, Genterstrasse 27, Berlin.

774,284 (February 10, 1921.) Value for cushion tires. Hugo Hessler, Ulrichstrasse 7, Hannover.

774,347 (March 22, 1921.) Hemorrhoidal pessary. Hugo Gohmann, Sedanstrasse 19, Dortmund.

774,442 (December 13, 1920.) Inhaling apparatus for human beings and animals. Firma Chr. Reimer, Munich.

774,518 (November 29, 1920.) Removable tire rack. Continental-Caoutchouc and Gutta-Percha-Compagnie, Hannover.

774,662 (March 26, 1921.) Air tube for bicycles, motorcycles and automobiles Gummiwerke Fulda. A. G. Fulda.

774,663. (March 26, 1921.) Cover for tires for bicycles, motorcycles, automobiles. Gummiwerke Fulda. A. G. Fulda.

774,696. (March 7, 1921.) Collapsible inhaling apparatus. Johann Joseph Meyer, Königin Louisenstrasse 6, Saarbrücken.

774,727 (March 24, 1921.) Traveling irrigator. Maximilian Bimler, Godullahütte, Kr. Beuthen.

THE FUEL COMMITTEE OF THE NATIONAL ASSOCIATION OF PURchasing Agents has been engaged in formulating recommendations for reasonably uniform provisions in coal contracts and expressing its idea of a fair contract to be used for the purchase and sale of coal. The offices of the Association are located at 19 Park Place, New York. L. F. Boffey, of that address, is secretary.

Review of the Crude Rubber Market

NEW YORK

THE New York rubber market for the last month may properly be described as weak and erratic. The dealers generally are overstocked and demand is very light, such as there is being consumers' business proceeding daily in small volume.

Early in the month the price of smoked sheet declined to 15½ and 15¾ cents under selling pressure. Within a few days after forced selling ceased, the price, under the influence of higher London cables, worked up to 17 cents, although at this time dealers were selling factory consumers at 16¼ cents. The market affords a good selection of off grades such as clean brown, ambers, etc.

Parás worked up gradually to a firmer position and about the middle of the month were offered at 18 and 18½ with buyers at 17½ cents. The Brazilian report that little rubber is coming down the rivers, and no collecting being done, tended to firm the New York market. There have been but few Brazilian offers in quantity. The far eastern markets are reported weak and rubber from those sources is quoted at declining prices.

The New York rubber market has reacted sympathetically with the recent reductions in automobile and tire prices, and a permanent upward tendency is not looked for until the large stocks of crude on hand pass into consumption at normal rate or faster. Today prices are ruling lower again. Spot smoked sheet is being offered to factories at 15 cents; July—September at 16½; October—December at 18; January—March at 20. One offer has been noted for October at 16½ cents.

Disturbed conditions in the trade reported from Akron and the Far East late in May had a depressng effect on the market and resulted in new low price records.

Imports during April were 17,269 tons of all grades, compared with 23,675 tons last year. Plantation arrivals for April were 16,861 tons, compared with 21,036 tons a year ago. Total imports of all grades for the first four months of 1921 were 54,503 tons, compared with 109,670 tons for the same period in 1920.

Spot and future quotations on standard plantation and Brazilian grades were as follows:

PLANTATIONS, May 5. Spot first latex crêpe, 18½ cents; May—June, 19 cents; July—September, 20 cents; July—December, 21 cents. May 24. Spot first latex crêpe, 18 cents; July—September, 19 cents; October—December, 20½ cents; January—March, 21½ cents.

May 5. Spot ribbed smoked sheets, 16¼ cents; May—June, 16¼ cents; July—September, 18 cents; July—December, 19 cents. May 24. Spot ribbed smoked sheets, 16 cents; July—September, 17 cents; October—December, 18½ to 19 cents; January—March, 20 cents.

May 5. Spot, No. 1 amber crêpe, 15½ cents; May—June, 16 cents; July—September, 17 cents; July—December, 18 cents. May 24. Spot, No. 1 amber crêpe, 14¼ cents; July—September, 15 cents; October—December, 16½ cents; January—March, 17½ cents.

May 2. Spot, No. 1 rolled brown crêpe, 12 cents; May—June, 12 cents; July—September. 12 cents. May 24. Spot No. 1 rolled brown crêpe, 11½ cents; July—September, 12 cents; October—December, 13½ cents; January—March, 15 cents.

SOUTH AMERICAN PARÁS AND CAUCHO. May 5. Spot upriver fine, 18 cents; islands fine, 18¼ cents; upriver coarse, 9 cents; islands coarse, 9½ cents; Cametá, 8½ cents; caucho ball, 11 cents. May 24. Spot upriver fine, 18 cents; islands fine, 18½ to 19 cents; upriver coarse, 8½ to 9 cents; islands coarse, 9 to 9½ cents; Cametá, 8½ cents; caucho ball, 9½ to 10½ cents.

NEW YORK QUOTATIONS

Following are the New York spot quotations, for one year ago, one month ago, and May 24, the current date:

PLANTATION HEVEA	June 1, 1920	May 1, 1921	May 24, 1921
First latex crêpe	$0.38 @.39	$0.19 @.19¼	$0.18 @
Off latex crêpe	@	.18 @.18½	@
Amber crêpe No. 1	.38 @.38½	.15½ @	.14¼ @
Amber crêpe No. 2	.37 @.37½	.14½ @	.13¼ @
Amber crêpe No. 3	.36 @.36½	.13½ @	.12½ @
Amber crêpe No. 4	.35 @	.12½ @	.12 @
Brown crêpe, thick and thin	.35 @.36	.15½ @	.13½ @
Brown crêpe, specky	.30 @	.13½ @	.12½ @
Brown crêpe, rolled	.30 @.31	.12 @.12½	.11½ @
Smoked sheet, ribbed	.38 @.38½	.17 @.17½	.16 @
Smoked sheet, plain	.36½ @.37½	.15½ @	.14 @
Unsmoked sheet	.35 @	.15½ @	.14 @
Colombo scrap No. 1	.30 @	.11½ @	@
Colombo scrap No. 2	.28 @	.09½ @	@
EAST INDIAN			
Assam crêpe	@	@	@
Assam onions	@	@	@
Penang block scrap	@	@	@
PONTIANAK			
Banjermassin	.12 @	.07 @	.06¾ @
Palembang	.13 @	.09 @	.07½ @
Pressed block	.25 @	.12 @	.11½ @
Sarawak	@	.06 @	.05¾ @
SOUTH AMERICAN			
PARAS			
Upriver, fine	.39½ @	.17½ @.18	.18 @
Upriver, medium	.37 @	.13½ @	.14 @.14½
Upriver, coarse	.30 @	.09½ @	.08½ @.08¾
Upriver, weak, fine	.36 @	@	.13 @
Islands, fine	.40½ @.41	.18 @	.18½ @.19
Islands, medium	.38 @	.13½ @	.14 @.15
Islands, coarse	*.22 @	.12½ @	.09 @.09½
Cametá	*.22 @	.12½ @	.08½ @
Acre Bolivian, fine	.41 @	.18 @	.17 @.18½
Madeira, fine	.43 @	.19½ @	.19 @.20
Peruvian, fine	.37 @	.16½ @	.16½ @.17
Tapajos, fine	.38 @	.15½ @	.16½ @.17
CAUCHO			
Upper caucho ball	.30½ @.31	.12½ @	.10¾ @.11½
Lower caucho ball	.28 @	.11 @	.09½ @.10
MANICOBAS			
Ceará negro heads	.32 @	.10 @	.12 @
Ceará scrap	.26 @	.06 @	.06 @
Maniçoba, 30% guarantee	.30 @	.11 @	.11 @
Mangabeira thin sheet	.30 @.31	.12 @	.13 @

CENTRALS	June 1, 1920	May 1, 1921	May 24, 1921
Corinto scrap	.25 @.26	.09 @.10	.11 @.11½
Central scrap	.25 @.26	.09 @.10	.10 @.11
Central scrap and strip	.23 @.24	.07 @.08	.06 @.07
Central wet sheet	.18 @.19	.04 @.05	.04 @
Esmeralda sausage	.25 @.26	.09 @.10	.11 @.12
Guayule, 20% guarantee	.27 @	@	@
Guayule, washed and dried	.37 @	.26 @	.26 @
AFRICANS			
Benguela, extra No.1, 28%	.18 @	@	@
Benguela, No. 2, 32½%	.15 @	@	@
Conakry niggers	.33 @	@	@
Congo prime, black upper	.36 @	@	@
Congo, prime, red upper	.20 @	@	@
Kassai, black	.36 @	@	@
red	.22 @	@	@
Massai sheets and strings	.33 @	@	@
Niger flake, prime	.17 @	.14 @	@
Rio Nunez ball	.35 @	@	@
Rio Nunez sheets, strings	.34 @	@	@
GUTTA PERCHA			
Gutta Siak	.29 @	.15 @.16	.13¾ @.15
Red Macassar	2.60 @	2.00 @2.75	2.30 @2.65
BALATA			
Block, Ciudad, Bolivar	.70 @	.54 @.55	.53 @
Colombia	.50 @.52	.45 @.46	.43 @
Panama	.48 @	.45 @.46	.43 @
Surinam sheet	.84 @	.70 @.71	.74 @
amber	.86 @	.80 @	.81 @

*Nominal.

RECLAIMED RUBBER

The production of reclaimed rubber is at present adjusted to the trade consumption which runs from 25 to 30 per cent of normal. Since all outlets for reclaim are restricted to this extent the quotations on all grades have fallen since the report for last month. In addition to the influences that depress trade in general the drastic reductions in tire prices early in May have disturbed the outlook for reclaimed rubber in common with other divisions of the trade.

NEW YORK QUOTATIONS

MAY 24, 1921

Prices subject to change without notice

STANDARD RECLAIMS

Floating	$0.14	@	$0.16
Friction	.14	@	.16
Mechanical	.09	@	.11
Shoe	.11½	@	.13¼
Tires, auto	.11¼	@	.13¼
truck	.09	@	.11
White	.15	@	.16

AMSTERDAM RUBBER MARKET

JOOSTEN & JANSSEN, Amsterdam, report, under date of April 29, 1921: This week the market was rather dull especially for spot parcels, owing to the fact that prices did not fluctuate very much. Only on the terminal market there was a rather big turnover and a good deal of the transactions was done in October—December crêpe at prices from about Fl. .63½ to Fl. .66. The demand for spot sheets seems to be slackening down for the present, while on the other hand there are still buyers for sheets on future deliveries now. This week closes practically at the same prices as last week, viz.:

Hevea crêpe, Fl. .56. Sheets, Fl. .49½ on the spot.
Hevea crêpe, Fl. .61. Sheets, Fl. .53 July—September.
Hevea crêpe, Fl. .65. Sheets, Fl. .56 October—December.

NEW YORK AVERAGE SPOT RUBBER PRICES

PLANTATIONS:	APRIL, 1921											MAY, 1921											
	18	19	20	21	22	23	25	26	27	28	29	30	2	3	4	5	6	7	9	10	11	12	13	14
Ribbed smoked sheet..	16¾	16¾	16⅝	16¾	16⅞	17¼	17⅜	17¼	17¼	17	17	16¾	16½	15¾	15¾	16¾	16¼	16⅜	16⅜	16⅜	16½	16½	16½	16¼
First latex crêpe.....	19	18¾	18⅝	18¼	18¾	19¼	19⅛	19	18¾	18⅞	18⅞	18½	18⅝	18½	18½	18¾	18½	18½	18¾	18½	18⅜	18¼	18¼	18¼
Off latex crêpe.....	16⅞	16¾	16½	16½	16¼	17	17¼	17	16¾	17	17	16½	16½	16¾	17	17¼	16¾	17½	17¼	17¼	16½	16⅜	16¼	16¼
No. 1 blanket crêpe....	14⅜	14⅞	14¾	14¾	14¾	14¾	15	15	15	15	15	14½	14⅜	14½	14¼	15	15	15	15	15	14¾	14⅝	14½	14¼
No. 2 blanket crêpe....	13¾	13⅝	13¾	13¾	13¾	13¾	14	14	14	14	14	13½	13⅞	13½	13¼	14	14	14	14	14	13¾	13⅝	13½	13¼
No. 3 blanket crêpe....	12¾	12¾	12¾	12¾	12¾	12¾	12⅞	13	13	13	13	12½	12½	12¼	12¼	13	13	13	13	13	12¾	12⅝	12½	12¼
Clean, thin, brown crêpe	14½	13½	13¾	13⅝	14½	14½	14¾	14¾	14¾	14	14¼	14	14¼	14¼	14¼	14¼	14¼	14¼	14¼	14⅜	14½	14	14½	13¾
Specky brown crêpe...	12½	11½	11¾	11¾	11¾	12	12¾	12¾	12¾	11¼	12½	11¼	11⅞	12¼	12½	12¼	12½	12½	12¼	12½	12¼	12⅛	12¼	12¼
Rolled brown crêpe....	11¼	11⅛	11⅛	11⅛	11⅛	11	11⅛	11¼	11⅛	11	11	10⅜	11¼	10¾	11	11	11¼	11	11	10⅞	10¾	11⅛	11⅛	10¾

COMPARATIVE LOW AND HIGH NEW YORK SPOT RUBBER PRICES

	May					
	1921*		1920		1919	
PLANTATIONS						
First latex crêpe	$0.17½	@ $0.19¼	$0.38	@ $0.43¼	$0.45½	@ $0.48
Smoked sheet ribbed.	.15½	@ .17½	.38	@ .43	.44½	@ .47
PARAS						
Upriver, fine	.16½	@ .18½	.39	@ .41¼	.56	@ .56½
Upriver, coarse	.08¾	@ .09½	.29½	@ .30½	.34	@ .34¾
Islands, fine	.17½	@ .18	.40	@ .41½	.47	@ .47½
Islands, coarse	.09	@ .12	.21	@	.21½	@
Cametá	.08½	@ .11	.22	@ .23	.21½	@ .23

*Figured to May 25, 1921.

ANTWERP RUBBER MARKET

GRISAR & CO., Antwerp, report under date of April 29, 1921:

Sales during the week ended April 22, amounted to 772 kilos, Congo-Angola thimbles at 2.05 francs; 6,013 kilos of first latex crêpe at a secret price; 9,997 kilos of ribbed smoked sheet at a secret price. During the same week arrivals at Antwerp by the S.S. "Anversville" were: Société Anonyme Bungé, 13,742 kilos and 5,955 kilos (Comminière); Osterrieth & Co., 10,750 kilos.

For the week ended April 29, Antwerp sales were 21,221 kilos of Ambriz thimbles, red, at 2.05 francs. Stocks on hand were about 1,840 tons.

The futures market remains inactive. There was a drop in prices of 0.35 francs during the previous week, and a further drop of 0.05 francs by April 29, when closing quotations were: April—May, 5.40; June, 5.55; July, 5.70; August—September, 5.80; October, 5.90; November—March, 6.05.

HAMBURG RUBBER MARKET

EFFEKTIV-ROHGUMMIMAKLER-VEREIN, Hamburg, reports, under date of April 23, 1921:

Despite the fact that some consumers held back because of the uncertainty concerning further sanctions by the Entente, to be expected after May 1, quite a lively business developed during the week. News of lower quotations in England and a drop in German exchange had no effect on the desire to buy.

Business was done in fine Pará and in various plantation grades; arrivals were normal; the prices moved between:

	Marks		
First latex crêpe	24	@	27
Ribbed smoked sheets	23	@	23½
Ribbed smoked sheets, lower grade	19	@	20
Brown crêpe, clean	17	@	21
Brown crêpe, somewhat barky	15	@	17
Dark crêpe	14	@	16
Hard fine Pará	25	@	27
Caucho ball	19	@	20
Panama and Colombia black balata	60	@	90
No. 1 balata sheet	100	@	110
Jelutong	13	@	17

SINGAPORE RUBBER MARKET

GUTHRIE & CO., Limited, Singapore, reports under date of April 14, 1921:

The weekly rubber auction, held yesterday and today, opened to a dull and depressed market. There were very few buyers present, and with no substantial orders to support the market, a poor sale resulted, only 324 tons being sold out of 1,117 tons catalogd. Standard sheet sold up to 32½ cents, but was not readily salable at this figure. No standard pale crêpe was sold, a few lots being withdrawn at 35 cents. Off-quality sheet and crêpe was again unsalable at reasonable prices. Lower grade crêpes were steady round about last week's prices. The following is the course of values:

	In Singapore per pound[1]			Sterling Equivalent per pound in London		
Sheet, fine ribbed smoked	32½	@	..	—/11½	@	—/..
Sheet, good ribbed smoked	17	@	31	—/ 6½	@	—/11¼
Crêpe, good pale	21½	@	34	—/ 8¾	@	1/ 0½
Crêpe, fine brown	18	@	22	—/ 7⅜	@	—/ 8¼
Crêpe, good brown	11	@	17	—/ 5⅜	@	—/ 7¼
Crêpe, dark	10	@	14	—/ 5⅜	@	—/ 6½
Crêpe, bark	8	@	13	—/ 4¼	@	—/ 6½

[1] Quoted in Straits Settlements currency, $1 equals $0.567 United States currency.

FEDERATED MALAY STATES RUBBER EXPORTS

An official report from Kuala Lumpur states that 7,408 tons of rubber were exported from the Federated Malay States in March. This compares with 6,091 tons in February and 9,524 tons in the corresponding month of last year. The total exports for the first quarter of the present year were 20,584 tons as against 30,424 tons in the corresponding period last year and 28,651 tons in 1919. Appended are the comparative statistics:

	1919	1920	1921
January ..... *tons*	7,163	11,119	7,085
February	10,809	9,781	6,091
March	10,679	9,524	7,408
Totals ..... *tons*	28,651	30,424	20,584

STRAITS SETTLEMENTS RUBBER EXPORTS

It is announced by official report from Singapore that 7,275 tons of rubber were exported from Straits Settlements ports in the month of March, as compared with 5,813 tons in February and 5,931 tons in the corresponding month last year. Transhipments amounted to 1,425 tons. The total exports for the first quarter of the present year amount to 18,897 tons as against 36,435 tons last year and 50,973 tons in 1919. Appended are the comparative statistics:

	1919	1920	1921
January ..... *tons*	14,404	13,125	5,809
February	15,661	17,379	5,813
March	20,908	5,931	7,275
Totals ..... *tons*	50,973	36,435	18,897

These figures include transhipments of rubber from various places in the neighborhood of the Straits Settlements, such as Borneo, Java, Sumatra and the non-Federated Malay States, as well as rubber actually exported from the Colony, but do not include rubber exports from the Federated Malay States.

PLANTATION RUBBER EXPORTS FROM JAVA

	January		February	
	1920	1921	1920	1921
To Netherlands ..... *kilos*	319,000	753,000	277,000	782,000
Great Britain	148,000	1,036,000	862,000	787,000
Germany	.....	47,000	.....	15,000
Belgium	.....	.....	.....	5,000
Italy	.....	.....	.....	1,000
United States	1,044,000	510,000	2,233,000	654,000
Singapore	391,000	359,000	351,000	272,000
Japan	.....	.....	29,000	43,000
Australia	.....	138,000	.....	64,000
Totals ..... *kilos*	1,902,000	2,843,000	3,752,000	2,623,000
Ports of origin:				
Tandjong Priok ..... *kilos*	529,000	1,563,000	2,054,000	1,024,000
Samarang	74,000	34,000	58,000	20,000
Soerabaya	1,071,000	1,021,000	1,620,000	1,338,000

PLANTATION RUBBER EXPORTS FROM MALAYA

(These figures include the production of the Federated Malay States, but not of Ceylon.)

	January 1 to February 28, 1921			January 1 to April 14, 1921	
	Singapore	Malacca	Penang	Port Swettenham	Totals
To United Kingdom ... *pounds*	8,760,940	1,704,487	3,483,100	6,337,530	20,286,057
The Continent..	2,408,539	1,739,485	23,067	33,600	4,204,691
Japan	7,658,201	.....	.....	.....	7,658,201
Ceylon	.....	.....	46,800	166,281	213,081
United States and Canada..	8,474,495	15,640	110,067	.....	8,600,202
Australia	356,495	806	.....	.....	357,301
Other countries.	.....	.....	796,533	.....	796,533
Totals... *pounds*	27,658,670	3,460,418	4,459,567	6,537,411	42,116,066

Compiled by Barlow & Co., Singapore.

RUBBER EXPORTS FROM PENANG

		January 1 to February 28	
		1920	1921
To Great Britain	*piculs*[1]	49,694	27,734
Europe		658	173
United States		37,566	823
Totals	*piculs*[1]	87,918	28,730

[1]One picul equals 133⅓ pounds.

CRUDE RUBBER ARRIVALS AT ATLANTIC AND PACIFIC PORTS AS STATED BY SHIPS' MANIFESTS

PARAS AND CAUCHO AT NEW YORK

	Fine	Medium	Coarse	Caucho	Totals Pounds
APRIL 19. By the S. S. "Hubert," from Manáos.					
G. Amsinck & Co., Inc.	.....	.....	.....	.....	22,249
Various	.....	.....	.....	.....	5,299
APRIL 19. By the S. S. "Hubert," from Pará.					
Arkell & Douglas, Inc.	.....	.....	.....	.....	28,904
Heidelbach, Ickelheimer & Co.	.....	.....	.....	.....	54,971
H. A. Astlett & Co.	.....	.....	.....	.....	20,000
APRIL 24. By the S. S. "Lake Farabee," from Pará.					
H. A. Astlett & Co.	90,000	11,000	.....	.....	101,000
MAY 8. By the S. S. "Glenspean," from Pará.					
General Rubber Co.	.....	.....	.....	.....	33,770
Meyer & Brown, Inc.	117,600*	.....	2,240	.....	119,840
Poel & Kelly	.....	.....	.....	.....	7,106
Paul Bertuch	98,140	20,545	2,517	370	121,572
Arkell & Douglas, Inc.	.....	.....	.....	.....	62,502
MAY 8. By the S. S. "Lancaster Castle," from Manáos.					
Arkell & Douglas, Inc.	119,981	40,753	8,798	112,455	281,987
Various	8,289	4,023	.....	.....	12,312
MAY 8. By the S. S. "Lancaster Castle," from Pará.					
Heidelbach, Ickleheimer & Co.	6,006	748	4,312	.....	11,066
General Rubber Co.	.....	.....	88,191	18,760	106,951
Arkell & Douglas, Inc.	38,777	29,130	.....	12,483	80,390
Poel & Kelly	38,148	7,106	13,068	.....	58,322
Paul Bertuch	87,970	.....	37,897	.....	125,867
Chas. T. Wilson & Co.	.....	.....	.....	29,700	29,700
H. A. Astlett & Co.	140,000	24,000	.....	.....	164,000
Various	.....	.....	23,888	23,454	47,342
MAY 14. By the S. S. "Dunstan," from Pará.					
H. A. Astlett & Co.	35,000	.....	.....	.....	35,000
MAY 14. By the S. S. "Dunstan," from Manáos.					
Paul Bertuch	172,858	9,351	2,727	.....	184,936
Meyer & Brown, Inc.	114,240*	.....	.....	78,400	192,640
MAY 17. By the S. S. "Justin," from Pará.					
H. A. Astlett & Co.	.....	.....	.....	110,000	110,000
Paul Bertuch	28,483	27,668	3,307	.....	59,458
Meyer & Brown, Inc.	25,200*	.....	.....	44,800	70,000
MAY 17. By the S. S. "Justin," from Manáos.					
Paul Bertuch	189,137	32,123	8,135	1,596	230,991

* Includes medium.

PLANTATIONS

(Figured at 180 pounds net to the bale or case.)

	Shipment from:	Shipped to:	Pounds.	Totals.
APRIL 19. By the S. S. "Vennonia," at New York.				
General Rubber Co.	London	New York	1,087,740	1,087,740
APRIL 19. By the S. S. "Saxonia," at New York.				
Goldman, Sachs & Co.	London	New York	1,116,000	
Aldens' Successors, Inc.	London	New York	32,220	1,148,220
APRIL 20. By the S. S. "Esther Dollar," at New York.				
Whittal & Co.	Colombo	New York	54,180	
L. Littlejohn & Co., Inc.	Colombo	New York	347,200	
G. B. Laboyteaux, Jr.	Colombo	New York	71,460	
Baird Rubber & Trading Co.	Colombo	New York	35,840	
H. A. Astlett & Co.	Colombo	New York	70,000	
Firestone Tire & Rubber Co.	Colombo	Akron	202,320	
Pacific Trading Corporation	Colombo	New York	47,700	
General Rubber Co.	Colombo	New York	1,318,320	
Rubber Trading Co.	Colombo	New York	499,500	
William H. Stiles & Co.	Colombo	New York	33,600	
The Goodyear Tire & Rubber Co.	Colombo	Akron	55,620	
W. G. Ryckman, Inc.	Colombo	New York	270,000	
Various	Colombo	Toronto	220,620	
Baird Rubber & Trading Co.	Singapore	New York	67,200	3,293,560
APRIL 21. By the S. S. "Eastern Knight," at New York.				
American Trading Co.	Colombo	New York	71,820	
L. Littlejohn & Co., Inc.	Colombo	New York	33,600	
F. R. Henderson & Co.	Colombo	New York	179,820	
J. A. Medina Co.	Colombo	New York	72,720	
Winter, Ross & Co.	Colombo	New York	12,060	
Rubber Importers & Dealers Co., Inc.	Colombo	New York	19,800	
East Asiatic Co., Inc.	Colombo	New York	7,380	
Baird Rubber & Trading Co.	Colombo	New York	109,760	
Various	Colombo	New York	592,640	1,099,600
APRIL 22. By the S. S. "City of Canton," at New York.				
Meyer & Brown, Inc.	Colombo	New York	145,600	
William H. Stiles & Co.	Colombo	New York	22,400	168,000
Poel & Kelly	Colombo	New York	55,800	
F. R. Henderson & Co.	Colombo	New York	119,160	
L. Littlejohn & Co., Inc.	Colombo	New York	67,200	
Baird Rubber & Trading Co.	Colombo	New York	42,560	284,720
APRIL 22. By the S. S. "Rondo," at New York.				
Aldens' Successors, Inc.	Soerabaya	New York	254,203	
S. & W. Birnbaum	Soerabaya	New York	73,005	
Adolph Hirsch & Co., Inc.	Soerabaya	New York	55,565	
Various	Soerabaya	New York	295,732	
The Fisk Rubber Co.	Singapore	Chicopee Falls	4,626	
S. & W. Birnbaum	Batavia	New York	332,842	
Thornett & Fehr	Batavia	New York	137,240	
Manhattan Rubber Manufacturing Co.	Batavia	New York	16,896	
Fred Stern & Co.	Batavia	New York	246,400	
Various	Batavia	New York	91,047	
Various	T'jong Priok	New York	50,087	
Joosten & Janssen	Sumatra	New York	22,400	1,580,043
APRIL 23. By the S. S. "West Calumb," at New York.				
William H. Stiles & Co.	Far East	New York	67,200	67,200
APRIL 24. By the S. S. "Niew Amsterdam," at New York.				
Meyer & Brown, Inc.	Rotterdam	New York	168,000	168,000
APRIL 25. By the S. S. "Bolton Castle," at New York.				
Rubber Importers & Dealers Co., Inc.	Singapore	New York	110,880	
Irwin-Harrisons & Crosfield, Inc.	Singapore	New York	38,520	
Baring Bros.	Singapore	New York	101,160	
L. Littlejohn & Co., Inc.	Singapore	New York	369,600	
Mitsubishi Goshi Kaisha	Singapore	New York	33,480	
American Trading Co.	Singapore	New York	37,980	
Rogers-Pyatt Shellac Co.	Singapore	New York	18,000	
The Goodyear Tire & Rubber Co.	Singapore	Akron	92,340	
Thornett & Fehr	Singapore	New York	201,600	
Paterson, Simmons & Co.	Singapore	New York	98,460	
Fred Stern & Co.	Singapore	New York	179,200	
Smith & Schippers	Singapore	New York	68,760	
The Fisk Rubber Co.	Singapore	Chicopee Falls	56,070	
Various	Cochin	New York	288,790	1,694,840
APRIL 26. By the S. S. "Sanuki Maru," at New York.				
Pacific Trading Co.	Colombo	New York	21,600	
Various	Colombo	New York	259,660	
L. Littlejohn & Co., Inc.	Ceylon	New York	89,600	
Hood Rubber Co.	London	Watertown	33,600	404,460
APRIL 29. By the S. S. "Tuscan Prince," at New York.				
American Trading Co.	Singapore	New York	94,680	
Rogers-Fyatt Shellac Co.	Singapore	New York	90,000	
William H. Stiles & Co.	Singapore	New York	100,800	
L. Littlejohn & Co., Inc.	Singapore	New York	560,000	
H. A. Astlett & Co.	Singapore	New York	170,000	
Balfour, Williamson & Co.	Singapore	New York	128,880	
McAllister Bros.	Singapore	New York	50,400	
Rubber Importers & Dealers Co., Inc.	Singapore	New York	131,040	
J. T. Johnstone & Co., Inc.	Singapore	New York	168,000	
Poel & Kelly	Singapore	New York	372,060	
Thornett & Fehr	Singapore	New York	417,600	
Mitsui & Co., Limited	Singapore	New York	33,480	
The Fisk Rubber Co.	Singapore	Chicopee Falls	73,820	
Pennsylvania Rubber Co.	Singapore	Jeanette	160,920	
Various	Singapore	Toronto	7,200	
Various	Singapore	New York	515,760	
Hood Rubber Co.	London	Watertown	33,600	3,108,240
APRIL 30. By the S. S. "Eurypylus," at New York.				
Rubber Importers & Dealers Co., Inc.	Singapore	New York	225,180	
Thornett & Fehr	Singapore	New York	318,240	
Meyer & Brown, Inc.	Singapore	New York	1,187,200	
William H. Stiles & Co.	Singapore	New York	11,200	
L. Littlejohn & Co., Inc.	Singapore	New York	672,000	
Jaeger & Co.	Singapore	New York	50,400	
Baring Bros.	Singapore	New York	68,220	
Thos. A. Desmond & Co.	Singapore	New York	116,640	
W. G. Ryckman, Inc.	Singapore	New York	243,000	
Chas. T. Wilson Co., Inc.	Singapore	New York	93,600	
J. T. Johnstone & Co., Inc.	Singapore	New York	156,832	
F. R. Henderson & Co.	Singapore	New York	164,520	
Poel & Kelly	Singapore	New York	296,280	
East Asiatic Co., Inc.	Singapore	New York	179,460	
Mitsubishi Goshi Kaisha	Singapore	New York	56,160	
H. A. Astlett & Co.	Singapore	New York	85,000	
Aldens' Successors, Inc.	Singapore	New York	20,160	
General Rubber Co.	Singapore	New York	443,700	
Hood Rubber Co.	Singapore	Watertown	112,000	
The Fisk Rubber Co.	Singapore	Chicopee Falls	112,070	
Various	Singapore	Toronto	49,098	
Thornett & Fehr	Penang	New York	10,080	
Fred Stern & Co.	Belawan-Deli	New York	22,400	
Baird Rubber & Trading Co.	Colombo	New York	208,320	4,901,760
APRIL 30. By the S. S. "Western Glen," at New York.				
Meyer & Brown, Inc.	London	New York	112,000	112,000
APRIL 30. By the S. S. "Verentia," at New York.				
Goldman, Sachs & Co.	London	New York	220,320	
L. Littlejohn & Co., Inc.	London	New York	11,200	231,520
APRIL 30. By the S. S. "Alaska Maru," at New York.				
Pennsylvania Rubber Co.	Singapore	Jeanette	61,200	
Poel & Kelly	Singapore	New York	648,000	
Eastern Rubber Co.	Singapore	New York	181,260	
Thornett & Fehr	Singapore	New York	219,600	
The Fisk Rubber Co.	Singapore	Chicopee Falls	22,400	1,132,460

	Shipment from:	Shipped to:	Pounds.	Totals.
APRIL 30. By the S. S. "Madioen," at New York.				
L. Littlejohn & Co., Inc..	Java	New York	291,200	
Mitsui & Co., Limited	Soerabaya	New York	50,220	
Baring Bros.	Soerabaya	New York	67,320	
William H. Stiles & Co..	Soerabaya	New York	56,000	
International Products Co.	Soerabaya	New York	28,980	
J. T. Johnstone & Co., Inc.	Soerabaya	New York	22,586	
Various	Soerabaya	New York	69,414	
Mitsui & Co., Limited...	Batavia	New York	39,960	
International Products Co.	Batavia	New York	92,700	
H. A. Astlett & Co.....	Batavia	New York	25,000	
Various	Batavia	New York	41,600	
Various	T'jong Priok	New York	18,000	802,980
MAY 1. By the S. S. "Westbrook," at New York.				
Various	Rotterdam	New York	12,780	12,780
MAY 1. By the S. S. "Noordam," at New York.				
L. Littlejohn & Co., Inc..	Rotterdam	New York	398,400	
Various	Rotterdam	New York	159,060	557,460
MAY 11. By the S. S. "Vasconia," at New York.				
L. Littlejohn & Co., Inc..	London	New York	89,600	89,600
MAY 11. By the S. S. "Carmania," at New York.				
Poel & Kelly.....	Liverpool	New York	12,960	
Various	Liverpool	New York	180	13,140
MAY 14. By the S. S. "City of Oran," at New York.				
H. A. Astlett & Co.....	Colombo	New York	50,000	
Hood Rubber Co.....	London	Watertown	22,400	72,400
MAY 15. By the S. S. "Koranna," at Boston.				
Hood Rubber Co.....	Ceylon	Watertown	186,820	
Baird Rubber & Trading Co.	Colombo	New York	50,290	237,110
MAY 15. By the S. S. "Rotterdam," at New York.				
L. Littlejohn & Co., Inc..	Rotterdam	New York	416,800	
H. A. Astlett & Co.....	Rotterdam	New York	20,000	
Various	Rotterdam	New York	87,900	524,700
MAY 17. By the S. S. "Pipestone County," at New York.				
Fred Stern & Co.....	London	New York	44,800	44,800
MAY 17. By the S. S. "Sommelsdyk," at New York.				
Baird Rubber & Trading Co.	Soerabaya	New York	22,400	
Various	Soerabaya	New York	24,459	
Thornett & Fehr.....	Batavia	New York	41,425	
Manhattan Rubber Manufacturing Co.....	Batavia	New York	38,745	
Baird Rubber & Trading Co.	Batavia	New York	18,330	
Lincoln Rubber Co.....	Batavia	Akron	19,911	
The Fisk Rubber Co.....	Batavia	Chicopee Falls	22,360	
Various	Batavia	New York	84,833	
Various	Belawan-Deli	New York	82,361	354,824
MAY 18. By the S. S. "Toyooka Maru," at New York.				
Baring Bros.	Colombo	New York	491,400	
L. Littlejohn & Co., Inc..	Colombo	New York	100,800	
Chas. T. Wilson Co., Inc.	Colombo	New York	141,120	
Meyer & Brown, Inc....	Colombo	New York	190,400	
Baird Rubber & Trading Co.	Colombo	New York	44,800	
Various	Colombo	New York	86,100	1,054,620
CENTRALS				
APRIL 19. By the S. S. "Panama," at New York.				
W. R. Grace & Co.....	Cristobal	New York	3,900	3,900
AFRICANS				
MAY 8. By the S. S. "France," at New York.				
Bergougnan Rubber Corporation	Havre	Trenton	115	115
PONTIANAK				
APRIL 22. By the S. S. "Rondo," at New York.				
Various	T'jong Priok	New York	123,552	123,552
APRIL 30. By the S. S. "Eurypylus," at New York.				
Various	Singapore	New York	85,800	85,800
MANGABEIRA				
MAY 14. By the S. S. "Taurus," at New York.				
Adolph Hirsch & Co., Inc.	Bahia	New York	6,614	6,614
GUAYULE (DRY)				
MAY 13. By rail at Eagle Pass, Texas.				
Continental Mexican Rubber Co.	Mexico	New York	75,020	75,020
BALATA				
APRIL 21. By the S. S. "Colon," at New York.				
Fromm & Co.....	Cristobal	New York	1,800	1,800
APRIL 22. By the S. S. "Lake Fackler," at New York.				
Middleton & Co., Limited	Surinam	New York	4,498	4,498
APRIL 25. By the S. S. "Matura," at New York.				
South & Central America Commercial Co.	Port of Spain	New York	15,000	
Boos & Co.....	Port of Spain	New York	11,250	
Ultramares Corporation...	Port of Spain	New York	4,200	30,450
MAY 5. By the S. S. "Aurora," at New York.				
Middleton & Co., Limited	Surinam	New York	11,104	
Wm. Schall & Co.....	Paramaribo	New York	1,500	12,604
MAY 5. By the S. S. "Allianca," at New York.				
Fromm & Co.....	Cristobal	New York	1,500	1,500
MAY 9. By the S. S. "Mayaro," at New York.				
South & Central America Commercial Co.	Port of Spain	New York	13,685	13,685
MAY 11. By the S. S. "Quillota," at New York.				
American Trading Co....	Cristobal	New York	2,300	2,300
MAY 12. By the S. S. "Carrillo," at New York.				
Eggers & Heinlein.....	Cristobal	New York	2,070	2,070
MAY 18. By the S. S. "Welshman," at New York.				
Fidanque Bros. & Sons..	Liverpool	New York	10,000	10,000

CUSTOM HOUSE STATISTICS

NEW YORK

IMPORTS

	March 1920 Pounds	March 1920 Value	March 1921 Pounds	March 1921 Value
UNMANUFACTURED—*free:*				
Crude rubber:				
From Belgium.....	229,812	$105,003	.....	.....
France	681,507	216,758	.....	.....
Italy	600,396	302,226	.....	.....
Netherlands	508,979	234,584	282,125	$63,225
Portugal	590,983	153,832	1,022,225	107,547
England	11,807,228	5,261,580	2,495,490	420,552
Nicaragua	22,929	6,103	.....	.....
Panama	4,581	891	.....	.....
Salvador	540	135	.....	.....
Mexico	50,918	20,731	.....	.....
Bolivia	25,328	9,511	1,213	96
Brazil	5,195,613	1,586,260	2,265,853	283,133
Colombia	28,249	9,261	40,376	10,592
Ecuador	48,485	11,979	.....	.....
British Guiana.....	5,205	3,449	8,930	2,858
Venezuela	5,514	2,002	28,291	18,270
British India.....	215,615	91,362	83,242	16,348
Straits Settlements.	34,750,472	16,908,820	12,680,798	3,914,106
British East Indies.	4,356,545	1,811,948	3,925,847	617,640
Dutch East Indies..	10,279,607	4,586,862	5,167,541	1,313,138
Hongkong	112,374	48,236	.....	.....
Japan	452,795	225,429	.....	.....
Costa Rica.....	.....	.....	175	20
Peru	.....	.....	4,638	974
Uruguay	.....	.....	6,051	2,745
Totals	69,973,675	$31,596,962	28,012,795	$6,771,244
Balata	61,035	32,289	46,216	28,042
Jelutong (Pontianak).....	1,052,426	164,260	228,424	29,722
Gutta percha.....	533,955	96,585	134,812	24,051
Totals	71,621,091	$31,890,096	28,422,247	$6,853,059
Rubber scrap and reclaimed.	991,603	68,097	132,709	10,955
Totals, unmanufactured..	72,612,694	$31,958,193	28,554,956	$6,864,014
Manufactures of rubber and gutta percha.....	.....	$71,338	.....	$52,666
Chicle .....*dutiable*	649,546	509,087	125,403	58,997

EXPORTS

MANUFACTURED:				
Automobile and other tires..	.....	$4,109,075	.....	$593,551
Inner tubes.....	.....	480,309	.....	47,060
Belting, hose and packing...	.....	369,670	.....	248,235
Rubber boots and shoes.*pairs*	838,772	778,099	124,701	120,636
Soles and heels.....	.....	60,155	.....	26,995
Druggists' sundries	.....	131,905	.....	57,900
Other rubber manufactures..	.....	468,051	.....	233,448
Totals, manufactured...	.....	$6,397,264	.....	$1,327,825
Insulated wire	.....	$507,189	.....	$632,633
UNMANUFACTURED—*free:*				
Rubber scrap and reclaimed.	403,991	$45,508	199,704	$14,295

FOREIGN EXPORTS

Crude rubber	94,040	$45,605	152,105	$27,901
Balata	83,390	46,976	27,002	14,751
Jelutong (Pontianak)	.....	.....	4,536	1,775
Rubber substitutes	17	9	.....	.....
Rubber manufactures	.....	1,398	.....	4,056

MASSACHUSETTS

IMPORTS

UNMANUFACTURED—*free:*				
Crude rubber:				
From England	99,943	$45,167	.....	.....
Straits Settlements...	.....	.....	2,100	$1,048
British East Indies..	.....	.....	332,640	53,639
Totals	99,943	$45,167	334,740	$54,687
Rubber scrap and reclaimed.	112,560	6,100	33,600	3,780
Totals, unmanufactured..	212,503	$51,267	368,340	$58,467
Rubber manufactures..*dutiable*	.....	$21,932	.....	$8,999

EXPORTS

MANUFACTURED:				
Automobile and other tires..	.....	$227	.....	$1,413
Inner tubes	.....	.....	.....	18
Belting, hose and packing...	.....	7,111	.....	1,160
Rubber boots and shoes..*pairs*	338,406	278,596	34,984	37,938
Soles and heels.....	.....	4,131	.....	202
Druggists' sundries	.....	2,567	.....	470
Other rubber manufactures..	.....	40,637	.....	14,817
Totals, manufactured...	.....	$333,269	.....	$56,018
Insulated wire	.....	$863	.....	$4,897

BUFFALO

IMPORTS

	March 1920 Pounds	March 1920 Value	March 1921 Pounds	March 1921 Value
UNMANUFACTURED—*free:*				
Rubber scrap and reclaimed.	275,127	$18,905	.....	.....
Rubber manufactures..*dutiable*	.....	248	.....	$551
Chicle .....*dutiable*	9	8	.....	.....
EXPORTS				
MANUFACTURED:				
Automobile and other tires..	.....	$233,616	.....	$48,353
Inner tubes	.....	40,552	.....	33,498
Belting, hose and packing..	.....	33,622	.....	9,802
Rubber boots and shoes..*pairs*	9,132	13,762	2,783	2,033
Soles and heels.....	.....	785	.....	145
Druggists' sundries	.....	21,105	.....	14,778
Other rubber manufactures..	.....	76,188	.....	42,368
Totals, manufactured...	.....	$419,630	.....	$150,977
Insulated wire	.....	$7,672	.....	$6,756
Rubber scrap and reclaimed.	311,091	44,305	31,369	4,810
FOREIGN EXPORTS				
Crude rubber	382,756	$156,793	274,345	$47,063
Balata	.....	.....	28,501	5,852
Jelutong (Pontianak).....	28,750	5,562	41,900	7,358
Rubber scrap and reclaimed.	49,693	9,690	.....	.....
Chicle	41,498	21,299	.....	.....
Rubber manufactures	.....	104	.....	138

PHILADELPHIA

IMPORTS

UNMANUFACTURED—*free:*				
Crude rubber:				
From Straits Settlements.	894,961	$375,736	.....	.....
Gutta percha	96,439	9,910	.....	.....
Totals	991,400	$385,646	.....	.....
Rubber scrap and reclaimed.	457	68	.....	.....
Totals, unmanufactured.	991,857	$385,714	.....	.....
Rubber manufactures..*dutiable*	.....	$229	.....	$2,038
EXPORTS				
MANUFACTURED:				
Automobile and other tires..	.....	$64,900	.....	.....
Inner tubes	.....	5,918	.....	.....
Belting, hose and packing...	.....	22,671	.....	$32,170
Other rubber manufactures..	.....	3,133	.....	278
Totals, manufactured...	.....	$96,622	.....	$32,448
Insulated wire	.....	$1,559	.....	.....
Rubber scrap and reclaimed	.....	.....	4,514	$499

NEW ORLEANS

IMPORTS

UNMANUFACTURED—*free:*				
Crude rubber:				
From Costa Rica	143	$136	.....	.....
Honduras	880	440	.....	.....
Nicaragua	4,560	985	3,720	$187
Totals, unmanufactured.	5,583	$1,561	3,720	$187
Chicle .....*dutiable*	5,214	$3,041	617	$280
EXPORTS				
MANUFACTURED:				
Automobile and other tires..	.....	$15,740	.....	$6,334
Inner tubes	.....	1,210	.....	41
Belting, hose and packing..	.....	5,150	.....	8,428
Rubber boots and shoes..*pairs*	13,177	17,700	12,388	18,171
Soles and heels.....	.....	347	.....	201
Druggists' sundries	.....	38	.....	49
Other rubber manufactures..	.....	3,323	.....	609
Totals, manufactured....	.....	$43,508	.....	$33,833
Insulated wire	.....	$5,128	.....	$3,789

OHIO

IMPORTS

UNMANUFACTURED—*free:*				
Crude rubber:				
From Straits Settlements..	2,913,216	$1,531,645	.....	.....
Totals, unmanufactured.	2,913,216	$1,531,645	.....	.....
Rubber manufactures.*dutiable*	.....	$100	.....	$446

SAN FRANCISCO

IMPORTS

	March 1920 Pounds	March 1920 Value	March 1921 Pounds	March 1921 Value
UNMANUFACTURED—*free:*				
Crude rubber:				
From British India	160	$96	.....	.....
Straits Settlements...	4,783,237	2,103,812	81,660	$17,058
Dutch East Indies...	831,050	290,140	76,080	20,132
Hongkong	532	187	.....	.....
Totals	5,614,979	$2,394,235	157,740	$37,190
Jelutong (Pontianak)	804	259	.....	.....
Totals, unmanufactured.	5,615,783	$2,394,494	157,740	$37,190
Rubber manufactures.*dutiable*	.....	$1,713	.....	$3,182
Chicle .....*dutiable*	32,654	22,613	.....	.....
EXPORTS				
MANUFACTURED:				
Automobile and other tires..	.....	$80,935	.....	$48,770
Inner tubes	.....	6,612	.....	1,804
Belting, hose and packing...	.....	39,773	.....	5,191
Rubber boots and shoes..*pairs*	876	1,555	5,011	16,570
Soles and heels.....	.....	52	.....	1,649
Druggists' sundries	.....	2,319	.....	1,069
Other rubber manufactures..	.....	7,428	.....	4,476
Totals, manufactured...	.....	$138,674	.....	$79,529
Insulated wire	.....	.....	.....	$3,876
Rubber scrap and reclaimed.	613,123	$29,628	40,710	$720
FOREIGN EXPORTS				
Rubber manufactures	.....	$25	.....	.....

WASHINGTON

IMPORTS

UNMANUFACTURED—*free:*				
Crude rubber:				
From Straits Settlements..	2,300,156	$1,089,963	.....	.....
Dutch East Indies...	120,178	57,510	.....	.....
Totals	2,420,334	$1,147,473	.....	.....
Rubber scrap and reclaimed.	11,000	270	1,690	$68
Totals, unmanufactured.	2,431,334	$1,147,743	1,690	$68
Rubber manufactures.*dutiable*	.....	$99	.....	$4
EXPORTS				
MANUFACTURED:				
Automobile and other tires..	.....	$40,942	.....	$988
Inner tubes	.....	532	.....	16
Belting, hose and packing...	.....	6,779	.....	1,240
Rubber boots and shoes..*pairs*	1,973	4,127	127	534
Druggists' sundries	.....	609	.....	853
Other rubber manufactures..	.....	4,511	.....	3,514
Totals, manufactured...	.....	$57,500	.....	$7,145
Insulated wire	.....	$2,103	.....	$30
Rubber scrap and reclaimed.	293,278	20,979	90,759	1,815

CHICAGO

IMPORTS

UNMANUFACTURED—*free:*				
Crude rubber:				
From England	15	$7	.....	.....
Gutta percha	.....	.....	5,878	$1,176
Totals	15	$7	5,878	$1,176
Rubber scrap and reclaimed.	.....	.....	13,800	414
Totals, unmanufactured.	15	$7	19,678	$1,590
Rubber manufactures..*dutiable*	.....	$3,423	.....	$5,273
Chicle .....*dutiable*	327,554	205,789	528,129	307,172

MICHIGAN

IMPORTS

Rubber scrap and reclaimed.	2,697	$34	.....	.....
Rubber manufactures.*dutiable*	.....	6,189	.....	$807
EXPORTS				
MANUFACTURED:				
Automobile and other tires..	.....	$57,104	.....	$26,082
Inner tubes	.....	7,464	.....	4,443
Belting, hose and packing...	.....	4,697	.....	2,721
Rubber boots and shoes..*pairs*	3,384	11,537	2,205	7,557
Druggists' sundries	.....	4,621	.....	611
Other rubber manufactures..	.....	15,592	.....	6,617
Totals, manufactured...	.....	$101,015	.....	$48,031
Insulated wire	.....	$3,039	.....	$9,463
Rubber scrap and reclaimed.	115,929	14,621	30,476	1,219

UNITED STATES CRUDE RUBBER IMPORTS FOR 1921 (BY MONTHS)

1921	Plantations	Parás	Africans	Centrals	Guayule	Manicoba and Matto Grosso	Balata	Miscellaneous	Waste	Totals 1921	Totals 1920
January .....*tons*	12,819	1,312	43	3	....	....	41	173	1,071	15,462	22,401
February	7,913	432	269	2	25	....	25	216	37	8,919	33,984
March	12,241	1,794	377	1	....	3	29	7	345	14,797	33,998
April	16,861	403	....	5	....	....	64	226	7	17,566	24,957
Totals, 4 months, 1921.....	49,834	3,941	689	11	25	3	159	622	1,460	56,744	.....
Totals, 4 months, 1920.....	97,049	9,432	2,521	428	227	13	267	3,043	2,360	.....	115,340

Compiled by The Rubber Association of America, Inc.

EXPORTS OF INDIA RUBBER MANUFACTURES AND INSULATED WIRE AND CABLE FROM THE UNITED STATES BY COUNTRIES, DURING THE MONTH OF FEBRUARY, 1921

EXPORTED TO—	Belting Value	Hose Value	Packing Value	Boots Pairs	Boots Value	Shoes Pairs	Shoes Value	Soles and Heels Value	Automobile Tires: Casings Value	Automobile Tires: Inner Tubes Value	Automobile Tires: Solid Tirer Value	Automobile Tires: All Others Value	Insulated Wire and Cables Value	Druggists' Rubber Sundries Value	All Other Manufactures of Rubber Value	Totals Value
EUROPE:																
Azores and Madeira Islands	.....	$160	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	$87	$159	$40	$446
Belgium	$59	1,035	.....	.....	.....	.....	.....	.....	$33,158	$6,697	.....	$2,000	16,594	501	2,261	62,305
Bulgaria	.....	.....	.....	.....	.....	13	$16	.....	.....	.....	.....	.....	.....	.....	.....	15
Denmark	974	.....	.....	.....	.....	6,534	8,011	$342	12,148	36	150	500	9,709	75	2,475	34,420
Finland	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	671	.....	.....	.....	409	1,080
France	2,816	.....	.....	.....	.....	1,417	1,049	.....	30,250	12	.....	105	21,948	1,338	23,553	81,071
Germany	.....	1,523	$450	.....	.....	.....	.....	.....	300	12	.....	.....	.....	.....	.....	2,285
Greece	14	.....	.....	.....	.....	.....	.....	.....	4,540	130	.....	.....	324	.....	80	5,088
Iceland and Faroe Islands	.....	.....	.....	144	$344	1,344	1,332	.....	.....	.....	.....	.....	.....	.....	.....	1,676
Italy	.....	308	.....	2	6	4	5	110	6,606	.....	.....	145	17,537	564	7,754	33,035
Malta, Gozo and Cyprus Islands	.....	.....	.....	.....	.....	.....	.....	.....	910	.....	.....	.....	.....	.....	.....	910
Netherlands	7,905	2,090	1,180	12	41	580	675	64	11,679	5,525	.....	.....	6,730	.....	7,009	42,898
Norway	9,000	.....	45	.....	.....	13,126	11,598	665	6,634	301	68	.....	11,725	845	373	41,254
Poland and Danzig	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	22,000	1,073	.....	23,073
Portugal	.....	.....	.....	262	1,216	1,140	1,196	.....	2,629	227	40	.....	6,900	275	50	12,533
Roumania	776	.....	66	.....	.....	.....	.....	.....	148	.....	.....	.....	.....	.....	.....	990
Spain	15	.....	.....	140	419	.....	.....	60	27,363	5,271	2,391	300	14,011	511	654	50,995
Sweden	342	1,920	3,797	11	74	.....	.....	.....	29,699	2,154	.....	.....	178,198	282	5,633	222,139
Switzerland	216	591	.....	.....	.....	144	170	.....	2,814	.....	.....	.....	4,789	.....	4,485	13,065
Turkey in Europe	.....	.....	.....	.....	.....	12	7	.....	3,495	.....	.....	.....	.....	83	51	3,636
England	5,014	81,956	10,908	72	103	9,128	8,499	4,740	89,193	8,740	3,143	700	27,782	21,435	105,540	367,753
Scotland	.....	.....	56	.....	.....	.....	.....	.....	.....	.....	.....	.....	6,895	23	965	7,939
Ireland	329	.....	485	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	814
TOTALS, EUROPE	$27,469	$89,583	$16,987	643	$2,203	33,442	$32,558	$5,981	$261,566	$29,145	$6,463	$3,750	$345,229	$29,164	$161,332	$1,009,421
NORTH AMERICA:																
Bermuda	.....	$1,660	$277	15	$52	1,445	$2,339	$193	.....	.....	.....	$349	$56	$149	$83	$5,158
British Honduras	$20	77	1	.....	.....	72	111	.....	$265	$78	.....	16	329	.....	36	933
Canada	8,662	6,464	3,460	909	2,657	3,921	3,788	140	93,818	9,059	496	861	23,985	16,117	124,005	293,512
Costa Rica	627	.....	.....	.....	.....	.....	.....	313	.....	11	.....	74	966	177	243	2,411
Guatemala	727	.....	.....	.....	.....	192	201	525	4,870	1,052	408	1,200	6,121	.....	79	15,183
Honduras	6,494	1,528	428	.....	.....	68	193	.....	754	96	595	.....	874	284	331	11,577
Nicaragua	67	574	.....	.....	.....	961	1,614	1,869	1,303	1,022	.....	.....	152	535	179	7,315
Panama	2,969	26,369	4,824	303	1,005	7,209	16,435	3,017	23,386	1,781	747	383	27,274	760	2,980	111,930
Salvador	.....	304	36	.....	.....	.....	.....	1,042	2,327	572	.....	745	3,718	164	2,153	11,061
Mexico	10,714	70,797	21,943	36	178	35,297	46,362	4,562	105,987	22,192	12,696	3,335	89,504	9,997	26,701	444,968
Miquelon, Langley, etc	.....	.....	.....	341	1,012	2	2	.....	.....	.....	.....	.....	.....	.....	.....	1,014
Newfoundland and Labrador	.....	495	.....	2,275	8,351	319	518	.....	97	29	.....	.....	1,228	241	$35	11,494
Barbados	.....	.....	.....	.....	.....	507	554	.....	3,512	261	.....	419	150	125	227	5,248
Jamaica	201	573	185	.....	.....	324	430	.....	2,092	121	913	.....	26	18	590	5,149
Trinidad and Tobago	.....	1,448	165	.....	.....	865	852	.....	10,359	1,232	2,768	.....	1,775	86	1,746	20,431
Other British West Indies	.....	97	65	.....	.....	1,493	1,933	359	2,601	305	231	978	137	118	136	6,960
Cuba	1,259	37,666	12,333	.....	.....	20,085	23,096	31,946	89,055	11,972	16,697	4,351	110,819	7,322	23,260	368,876
Virgin Islands of United States	.....	.....	44	.....	.....	703	1,162	.....	371	161	.....	.....	83	1	27	1,849
Dutch West Indies	.....	160	.....	.....	.....	616	742	.....	2,045	287	.....	.....	260	.....	51	3,485
French West Indies	183	.....	.....	.....	.....	.....	.....	.....	.....	.....	138	.....	129	.....	15	465
Haiti	.....	178	38	.....	.....	93	173	.....	1,214	208	.....	.....	31	13	675	2,530
Dominican Republic	30	1,260	688	4	23	1,289	1,833	116	7,810	1,875	97	.....	3,729	370	1,093	18,924
TOTALS, NORTH AMERICA	$51,953	$149,650	$44,487	3,883	$13,278	75,461	$102,338	$44,082	$351,866	$51,414	$35,786	$12,711	$271,286	$36,477	$185,145	$1,350,473
OCEANIA:																
Australia	$2,066	$478	$710	432	$2,043	3,159	$3,732	.....	$38,622	$2,353	$931	$2,045	$50,974	$2,553	$10,714	$117,221
New Zealand	12,025	1,462	2,225	72	190	3,796	3,471	$264	96,798	1,359	8,266	.....	13,937	3,626	7,434	151,057
Other British Oceania	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	320	.....	80	.....	.....	400
French Oceania	.....	.....	.....	.....	.....	.....	.....	.....	67	.....	.....	.....	.....	.....	.....	67
Other Oceania	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	334	.....	.....	.....	.....	334
Philippine Islands	10,480	9,416	7,544	.....	.....	36,936	41,724	14,907	68,348	8,987	21,978	16,470	33,089	747	25,906	259,596
TOTALS, OCEANIA	$24,571	$11,356	$10,479	504	$2,233	43,891	$48,927	$15,171	$203,835	$12,699	$31,829	$18,515	$98,080	$6,926	$44,054	$528,675
SOUTH AMERICA:																
Argentina	$944	$10,348	$3,692	.....	.....	2,306	$2,483	$2,604	$109,478	$8,917	$2,278	$672	$52,833	$9,063	$22,439	$225,751
Bolivia	2,088	230	7	.....	.....	.....	.....	.....	739	.....	.....	206	51	.....	402	3,723
Brazil	5,555	12,527	293	.....	.....	3,312	3,294	5,701	14,368	519	380	10	127,841	6,818	7,497	184,803
Chile	11,208	12,176	2,311	368	$1,221	6,116	4,412	.....	6,471	1,059	623	.....	6,933	1,354	8,540	56,308
Colombia	2,422	1,610	658	.....	.....	853	1,091	21	7,883	695	451	115	13,755	856	1,109	30,666
Ecuador	391	695	.....	.....	.....	2,800	2,800	.....	2,942	682	201	.....	771	88	600	9,170
British Guiana	.....	38	.....	.....	.....	195	254	.....	3,908	390	.....	.....	2,564	.....	744	7,898
Dutch Guiana	.....	27	.....	.....	.....	108	200	86	616	96	.....	.....	39	385	2	1,451
Paraguay	1,424	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,424
Peru	1,306	9,610	1,147	.....	.....	.....	.....	.....	23,663	2,908	788	60	16,051	1,264	1,964	58,761
Uruguay	2,068	1,278	.....	1,152	5,183	13,688	13,871	.....	23,367	658	.....	.....	13,099	1,555	12,868	73,947
Venezuela	.....	200	1,793	.....	.....	96	110	668	7,021	923	.....	44	5,044	174	625	16,602
TOTALS, SOUTH AMERICA	$27,406	$48,739	$9,901	1,520	$6,404	29,474	$28,515	$9,080	$200,456	$16,847	$4,721	$1,107	$238,981	$21,557	$56,790	$670,504

EXPORTED TO—	Belting Value	Hose Value	Packing Value	Boots Pairs	Boots Value	Shoes Pairs	Shoes Value	Soles and Heels Value	Automobile Tires: Casings Value	Automobile Tires: Inner Tubes Value	Automobile Tires: Solid Tires Value	Automobile Tires: All Others Value	Insulated Wire and Cables Value	Druggists' Rubber Sundries Value	All Other Manufactures of Rubber Value	Totals Value
ASIA:																
Aden	....	....	....	....	....	....	....	....	$2,520	$300	....	....	....	....	....	$2,820
China	....	$6,435	$2,520	....	....	7,179	$7,422	$44	13,304	635	....	$200	$74,286	$4,559	$12,546	121,951
Kwantung, leased territory	....	58	....	....	....	216	277	....	....	....	....	....	....	280	....	615
Chosen	....	....	33	....	....	168	138	....	1,918	562	....	....	....	33	....	2,684
British India	$1,666	7,842	1,045	24	$73	578	1,255	26	26,949	6,432	$18,332	2,515	55,785	2,646	1,781	126,347
Straits Settlements	990	80	....	....	....	1,122	1,729	....	31	....	3,475	....	1,513	1,416	435	9,669
Other British East Indies	....	....	....	....	....	....	....	....	....	....	445	....	....	....	121	566
Dutch East Indies	1,406	12,469	276	12	43	503	806	....	67,312	6,167	6,657	899	14,452	1,288	7,743	119,518
Hongkong	....	23	....	48	144	954	1,080	....	3,131	....	102	....	23	198	11,002	15,703
Japan	1,220	2,586	5,297	255	773	13,504	19,322	....	3,996	1,000	500	....	11,327	18	28,565	74,704
Siam	261	....	....	....	....	192	240	....	220	20	....	....	....	627	....	1,368
Turkey in Asia	....	....	....	....	....	104	138	196	31,836	3,043	408	....	179	83	827	36,710
TOTALS, ASIA	$5,543	$29,493	$9,271	339	$1,033	24,520	$32,407	$266	$151,217	$18,159	$29,919	$3,614	$157,565	$11,148	$63,020	$512,655
AFRICA:																
British West Africa	....	....	....	....	....	....	....	$613	$52,506	$7,023	....	....	....	$23	$73	$60,238
British South Africa	$45,538	$39,375	$4,800	644	$3,096	1,114	$1,828	....	17,969	4,235	$1,730	....	$12,307	2,521	18,045	151,444
British East Africa	....	104	....	....	....	....	....	....	3,579	527	226	....	254	....	2,072	6,762
Canary Islands	....	....	....	....	....	....	....	....	3,107	25	....	....	....	51	16	3,199
French Africa	....	....	....	....	....	....	....	....	70	9	....	$296	....	....	....	375
Kamerun, etc.	....	....	....	....	....	15	30	....	....	....	....	....	....	....	....	30
Portuguese Africa	....	....	656	....	....	....	....	247	....	....	50	....	....	....	150	1,103
Egypt	....	910	....	....	....	....	....	....	2,369	32	....	....	171	229	1,941	5,652
TOTALS, AFRICA	$45,538	$40,389	$5,456	644	$3,096	1,129	$1,858	$860	$79,600	$11,851	$2,006	$296	$12,732	$2,824	$22,297	$228,803
GRAND TOTALS	$182,471	$369,210	$96,581	7,533	$28,247	207,917	$246,603	$75,440	$1,248,540	$140,115	$110,724	$39,993	$1,123,873	$106,096	$532,638	$4,300,531

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORY OF THE UNITED STATES

	Belting, Hose and Packing Value	Boots and Shoes Pairs	Boots and Shoes Value	Tires: Automobile Value	Tires: All Others Value	Insulated Wire and Cables Value	Druggists' Rubber Sundries Value	All Other Manufactures of Rubber Value	Totals Value
Hawaii	$9,653	....	....	$114,638	$1,584	......	......	$9,213	$135,088
Porto Rico	2,841	....	....	6,490	362	......	......	4,845	14,538
TOTALS	$12,494	....	....	$121,128	$1,946	......	......	$14,058	$149,626

Compiled by the Bureau of Foreign Commerce, Department of Commerce, Washington, D. C.

OFFICIAL INDIA RUBBER STATISTICS FOR THE UNITED STATES

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	February 1920 Pounds	February 1920 Value	February 1921 Pounds	February 1921 Value
UNMANUFACTURED—*free:*				
India rubber:				
From France	827,307	$243,229	....	....
Netherlands	2,586,622	1,123,583	360,640	$74,928
Portugal	220,462	44,000	....	....
United Kingdom	15,639,792	7,431,553	66,981	11,303
Canada	9,820	4,630	....	....
Central America	7,312	2,336	1,609	384
Mexico	125,716	50,065	....	....
Brazil	3,807,367	1,177,767	1,147,121	210,290
Peru	1,722,297	557,203	....	....
Other South Am.	519,485	155,812	28,132	12,757
British E. Indies	42,982,996	18,823,383	17,081,824	5,510,998
Dutch E. Indies	2,429,197	874,662	3,217,698	1,054,815
Other countries	476,531	158,312	29,160	10,202
Totals	71,354,904	$30,646,535	21,933,165	$6,885,677
Balata	328,325	$184,304	187,356	$114,432
Guayule	40,020	12,006	55,150	11,941
Jelutong (Pontianak)	1,292,316	156,414	378,565	49,260
Gutta percha	252,215	52,629	251,611	42,406
Rubber scrap	1,327,957	92,215	277,849	13,733
Totals, unmanufactured	74,595,737	$31,144,103	23,083,696	$7,117,449
Chicle (dutiable)	744,925	$596,143	956,209	$474,545
India rubber and gutta percha	....	58,070	....	65,009
India rubber substitutes	51,200	8,842	796	250

EXPORTS OF DOMESTIC MERCHANDISE

	1920 Pounds	1920 Value	1921 Pounds	1921 Value
MANUFACTURED—				
India rubber:				
Scrap and old	1,446,414	$100,129	795,187	$47,005
Reclaimed	409,642	67,451	60,493	8,810
Belting[1]	....	170,299	....	182,471
Hose[1]	....	272,348	....	369,210
Packing[1]	....	105,047	....	96,581
Boots[1] ... *pairs*	39,933	139,224	7,533	28,247
Shoes[1] ... *pairs*	1,019,959	866,483	207,917	246,603
Soles and heels[1]	....	64,848	....	75,440
Tires:				
Casings[1]	....	3,849,706	....	1,248,540
Inner tubes[1]	....	214,311	....	140,115
Solid tires[1]	....	213,952	....	110,724
All other tires[1]	....	58,067	....	39,993
Druggists' rubber sundries[1]	....	121,400	....	106,096
Suspenders and garters	....	283,267	....	71,534
Other rubber manufacturers[1]	....	610,247	....	532,638
Totals, manufactured	....	$7,136,779	....	$3,304,007
Fountain pens.... *number*	20,458	$17,022	35,959	$56,153
Insulated wire and cables	....	567,036	....	1,123,873

EXPORTS OF FOREIGN MERCHANDISE

	1920 Pounds	1920 Value	1921 Pounds	1921 Value
UNMANUFACTURED—				
India rubber	144,575	$60,270	722,789	$134,738
Balata	34,000	19,135	82,163	29,391
Jelutong (Pontianak)	60,454	9,015	....	....
Rubber scrap	3,099	300	....	....
Totals, unmanufactured	242,128	$88,720	804,952	$164,129
MANUFACTURED—				
Gutta percha and India rubber	....	$1,369	....	$12,051
India rubber substitutes	14,540	10,553	....	....
Totals, manufactured	....	$11,922	....	$12,051

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORIES OF THE UNITED STATES

	1920 Pounds	1920 Value	1921 Pounds	1921 Value
MANUFACTURED—				
To Alaska:				
Belting, hose and packing	....	$5,461	....	$12,990
Boots and shoes.. *pairs*	3,154	8,611	3,820	7,973
Other rubber goods	....	5,345	....	3,103
Totals	....	$19,417	....	$24,066
To Hawaii:				
Belting, hose and packing	....	$7,031	....	$9,653
Automobile tires	....	44,259	....	114,638
Other tires	....	502	....	1,584
Other rubber goods	....	4,902	....	9,213
Totals	....	$56,694	....	$135,088
To Porto Rico:				
Belting, hose and packing	....	$9,080	....	$2,841
Automobile tires	....	47,318	....	6,490
Other tires	....	7,539	....	362
Other rubber goods	....	21,388	....	4,845
Totals	....	$85,325	....	$14,538

[1]Details of exports of domestic merchandise by countries during February, 1921, appear in this issue.

RUBBER STATISTICS FOR THE DOMINION OF CANADA

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	January 1920 Pounds	January 1920 Value	January 1921 Pounds	January 1921 Value
UNMANUFACTURED—*free:*				
Rubber, gutta percha, etc.:				
From United Kingdom	855,876	$478,333	246,056	$76,828
United States	859,030	413,566	965,233	219,515
British East Indies:				
Ceylon	.....	.....	112,010	31,633
Straits Settlements	532,437	275,751	440,345	103,686
Other countries	2,421	997	.....	.....
Totals	2,249,764	$1,168,647	1,763,644	$431,662
Rubber, recovered	165,197	$27,836	129,736	21,630
Rubber, powdered, and rubber or gutta percha scrap	105,582	11,376	17,723	1,396
Rubber substitutes	183,429	21,715	134,888	23,099
Totals, unmanufactured	2,703,972	$1,229,574	2,045,991	$477,787
PARTLY MANUFACTURED—				
Hard rubber sheets and rods	6,741	$6,266	7,581	$3,662
Hard rubber tubes	.....	3,726	.....	1,812
Rubber thread, not covered	5,683	8,382	131	185
Totals, partly manufactured	12,424	$18,374	7,712	$5,659
MANUFACTURED—				
Belting	.....	$12,218	.....	$14,979
Hose	.....	7,963	.....	14,478
Packing	.....	7,254	.....	6,741
Boots and shoes	.....	28,765	.....	3,341
Clothing, including waterproofed	.....	23,579	.....	16,562
Gloves	.....	933	.....	1,919
Hot water bottles	.....	3,077	.....	1,908
Tires, solid	.....	29,636	.....	23,188
Tires, pneumatic	.....	61,466	.....	90,316
Tires, inner tubes	.....	889	.....	13,802
Elastic, round or flat	.....	49,258	.....	18,677
Mats and matting	.....	465	.....	117
Cement	.....	5,986	.....	2,060
Other rubber manufactures	.....	116,740	.....	113,425
Totals, manufactured	.....	$348,229	.....	$321,513
Totals, rubber imports	2,716,396	$1,596,177	2,053,703	$804,959
Insulated wire and cables:				
Wire and cables covered with cotton, linen, silk, rubber, etc.	.....	$13,857	.....	$8,609
Copper wire and cables, covered as above	.....	17,643	.....	23,240
Chicle	31,426	9,222	.....	.....
Fillets	.....	.....	.....	369
Webbing	.....	60,539	.....	15,660
Fountain pens	.....	2,699	.....	2,156

EXPORTS OF DOMESTIC AND FOREIGN RUBBER GOODS

	January 1920 Produce of Canada Value	January 1920 Reexports of Foreign Goods Value	January 1921 Produce of Canada Value	January 1921 Reexports of Foreign Goods Value
UNMANUFACTURED—				
Crude and waste rubber	$19,989	$53	$720	.....
MANUFACTURED—				
Belting	$256	.....	$16,046	.....
Hose	26,858	.....	34,110	.....
Boots and shoes	238,708	272	233,327	$382
Clothing, including waterproofed	2,194	.....	376	818
Tires, pneumatic	891,728	.....	348,307	.....
Tires	21,437	8,963	8,047	23,096
Other manufactures	21,842	4,067	68,870	3,660
Totals, manufactured	$1,203,023	$13,302	$709,083	$27,956
Totals, rubber exports	$1,223,012	$13,355	$709,803	$27,956
Insulated wire and cable:				
Copper wire and cable	$33,788	.....	$64,542	.....
Chicle	108,527	.....	.....	.....

RUBBER STATISTICS FOR THE DOMINION OF CANADA

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	February 1920 Pounds	February 1920 Value	February 1921 Pounds	February 1921 Value
UNMANUFACTURED—*free:*				
Rubber, gutta percha, etc.:				
From United Kingdom	1,536,109	$897,511	26,902	$3,707
United States	616,546	324,054	782,934	151,015
Belgian Congo	59,035	21,947	.....	.....
Brazil	.....	.....	72,908	12,659
British East Indies:				
Ceylon	224,000	123,703	.....	.....
Straits Settlements	1,041,692	484,290	903,500	223,679
Dutch East Indies	114	57	.....	.....
Other countries	13,262	9,056	.....	.....
Totals	3,490,758	$1,860,618	1,786,244	$391,060
Rubber, recovered	422,442	75,010	12,223	2,148
Rubber, powdered and rubber or gutta percha scrap	67,511	5,634	187,985	19,924
Rubber substitute	158,505	20,021	64,961	16,597
Totals, unmanufactured	4,139,216	$1,961,283	2,051,413	$429,729
PARTLY MANUFACTURED—				
Hard rubber sheets and rods	5,419	$3,307	12,896	$11,659
Hard rubber tubes	.....	1,845	.....	1,346
Rubber thread, not covered	5,382	7,950	197	257
Totals, partly manufactured	10,801	$13,102	13,093	$13,262
MANUFACTURED—				
Belting	.....	$12,633	.....	$9,283
Hose	.....	7,718	.....	8,630
Packing	.....	6,496	.....	3,889
Boots and shoes	.....	31,992	.....	7,285
Clothing, including waterproofed	.....	30,977	.....	18,873
Gloves	.....	754	.....	1,874
Hot water bottles	.....	495	.....	2,319
Tires, solid	.....	7,237	.....	8,501
Tires, pneumatic	.....	412,765	.....	236,442
Tires, inner tubes	.....	40,050	.....	17,668
Elastic, round or flat	.....	29,453	.....	24,857
Mats and matting	.....	281	.....	296
Cement	.....	8,392	.....	1,907
Other rubber manufactures	.....	120,830	.....	102,332
Totals, manufactured	.....	$710,073	.....	$444,156
Totals, rubber imports	4,150,017	$2,684,458	2,064,506	$887,147
Insulated wire and cables:				
Wire and cables covered with cotton, linen, silk, rubber etc.	.....	$10,761	.....	$5,905
Copper wire and cables, covered as above	.....	18,469	.....	20,077
Chicle	137,455	114,918	90,794	51,925
Fillets	.....	6,829	.....	47
Webbing	.....	39,560	.....	9,095
Fountain pens	.....	1,144	.....	1,099

EXPORTS OF DOMESTIC AND FOREIGN RUBBER GOODS

	February 1920 Produce of Canada Value	February 1920 Reexports of Foreign Goods Value	February 1921 Produce of Canada Value	February 1921 Reexports of Foreign Goods Value
UNMANUFACTURED—				
Crude and waste rubber	$41,484	$25	$3,663	.....
MANUFACTURED—				
Belting	1,354	.....	8,097	.....
Hose	12,993	.....	13,090	.....
Boots and shoes	93,079	126	79,359	$1,228
Clothing, including waterproofed	616	9	4,116	.....
Tires, pneumatic	822,316	.....	166,532	.....
Tires	626	3,354	7,978	102
Other manufactures	17,238	1,850	20,209	4,549
Totals, manufactured	$948,222	$5,339	$299,381	$5,879
Totals, rubber exports	$989,706	$5,364	$303,044	$5,879
Insulated wire and cable:				
Copper wire and cable	$438	.....	$91,207	.....

A LIGHT CAR WEIGHING 1,750 POUNDS AND TRAVELING 25 MILES per hour, covers 2,200 feet per minute and moves with a force of nearly 4,000,000 foot pounds. A heavy car weighing 5,300 pounds and going at 40 miles per hour, travels 3,520 feet per minute, moving with a force in excess of 18,500,000 foot pounds. Tire testing experts say the force of road shocks runs into the millions. Load the car with passengers or increase the speed and you increase these forces millions more. To stand such strains, a standard make five-inch cord tire has 20 to 26 cords per inch. Though each cord has a strength of fifteen pounds, there are eight plies or layers of these cords. This gives the five-inch tire a strength in fabric carcass alone of 2,400 to 3,000 pounds to the square inch, irrespective of strength given by other parts.—Miller News Service.

UNITED KINGDOM RUBBER STATISTICS

IMPORTS

February

	1920 Pounds	1920 Value	1921 Pounds	1921 Value
UNMANUFACTURED—				
Crude rubber:				
From—				
Straits Settlements	6,252,100	£793,729	4,631,200	£251,928
Federated Malay States	7,557,000	936,944	4,705,900	270,635
British India	1,224,500	154,368	1,262,500	71,610
Ceylon and dependencies	4,105,500	506,041	3,648,300	204,014
Other Dutch possessions in Indian Seas	949,000	122,439	635,500	35,749
Dutch East Indies (except other Dutch possessions in Indian Seas)	735,900	99,103	1,972,600	107,126
Other countries in East Indies and Pacific, not elsewhere specified	397,500	49,582	387,900	19,872
Brazil	3,400	300	432,900	16,706
Peru	.....	.....	7,900	433
South and Central America (except Brazil and Peru)	36,100	4,034	72,800	3,780
West Africa:				
French West Africa	12,300	1,342	.....	.....
Gold Coast	3,300	240	2,800	150
Other parts of West Africa	198,600	14,870	55,300	2,688
East Africa (including Madagascar)	17,600	2,045	45,100	2,410
Other countries	115,800	13,990	77,400	4,261
Totals	21,608,600	£2,699,027	17,938,100	£991,362
Waste and reclaimed rubber	1,206,900	18,857	36,300	528
Totals, unmanufactured	22,815,500	£2,717,884	17,974,400	£991,890
Gutta percha and balata	849,400	£153,513	855,600	£155,507
Rubber substitutes	76,900	3,012	22,700	620
MANUFACTURED—				
Boots and shoes...*dozen pairs*	19,035	£44,045	9,193	£17,471
Waterproof clothing	.....	1,620	.....	376
Insulated wire	.....	965	.....	3,607
Tires and tubes	.....	496,511	.....	213,264
Other rubber manufactures	.....	53,985	.....	63,557

EXPORTS

UNMANUFACTURED—				
Waste and reclaimed rubber	751,800	£24,573	504,600	£16,667
Rubber substitutes	236,500	11,223	25,900	1,645
Totals	988,300	£35,796	530,500	£18,312
MANUFACTURED—				
Boots and shoes...*dozen pairs*	15,017	£31,577	11,674	£23,654
Waterproof clothing	.....	199,560	.....	70,946
Insulated wire	.....	100,130	.....	143,780
Submarine cables	.....	39,814	.....	106,752
Tires and tubes	.....	445,099	.....	167,473
Other rubber manufactures	.....	294,292	.....	200,138

EXPORTS—COLONIAL AND FOREIGN

UNMANUFACTURED—				
Crude rubber:				
To Russia	34,900	£4,255	.....	.....
Sweden, Norway and Denmark	201,000	24,094	324,000	16,741
Germany	226,100	26,061	1,207,400	58,835
Belgium	720,100	657	155,500	8,856
France	1,800,900	23,870	499,800	30,264
Spain	6,500	750	34,300	1,859
Italy	559,300	72,521	100,000	5,879
Austria-Hungary	.....	.....	567,600	29,544
Other European countries	85,300	11,000	585,300	22,649
United States	7,611,500	983,670	300,500	17,173
Canada	638,100	82,708	.....	.....
Other countries	138,700	16,345	15,600	909
Totals, rubber	12,021,500	£1,543,931	3,790,000	£192,709
Waste and reclaimed rubber	18,800	£425	.....	.....
Gutta percha and balata	95,100	19,282	83,200	£15,986
Rubber substitutes	3,100	140	12,700	325
MANUFACTURED—				
Boots and shoes...*dozen pairs*	4	£48	14	£47
Waterproof clothing	.....	12	.....	.....
Tires and tubes	.....	4,741	.....	40,821
Other manufactures	.....	2,714	.....	1,771
Totals, manufactured	.....	£7,515	.....	£42,639

UNITED KINGDOM RUBBER STATISTICS

IMPORTS

March

	1920 Pounds	1920 Value	1921 Pounds	1921 Value
UNMANUFACTURED—				
Crude rubber:				
From—				
Straits Settlements	4,765,800	£596,000	4,958,100	£267,451
Federated Malay States	5,586,300	688,412	5,326,400	303,988
British India	1,345,500	167,229	1,480,200	84,348
Ceylon and dependencies	3,943,200	461,460	4,318,200	233,970
Other Dutch possessions in Indian Seas	708,400	85,934	584,800	33,841
Dutch East Indies (except other Dutch possessions in Indian Seas)	67,400	7,836	2,374,900	134,754
Other countries in East Indies and Pacific, not elsewhere specified	186,400	23,439	215,400	11,041
Brazil	3,492,400	418,040	766,100	34,668
Peru	12,600	1,395	.....	.....
South and Central America (except Brazil and Peru)	11,200	1,200	11,200	560
West Africa:				
French West Africa	52,600	4,380	5,000	250
Gold Coast	47,400	5,766	32,200	1,699
Other parts of W. Africa	97,500	9,721	24,300	1,262
East Africa, including Madagascar	72,400	8,635	2,200	115
Other countries	241,000	18,428	69,400	3,229
Totals	20,630,100	£2,497,875	20,168,400	£1,111,176
Waste and reclaimed rubber	536,900	13,174	152,500	3,432
Totals, unmanufactured	21,167,000	£2,511,049	20,320,900	£1,114,608
Gutta percha and balata	657,500	£115,982	328,200	£55,679
Rubber substitutes	166,200	7,210	15,100	682
MANUFACTURED—				
Boots and shoes...*dozen pairs*	30,484	£82,076	5,004	£15,039
Waterproof clothing	.....	3,156	.....	288
Insulated wire	.....	666	.....	1,684
Submarine cables	.....	50	.....	.....
Tires and tubes	.....	351,724	.....	267,910
Other rubber manufactures	.....	55,321	.....	65,928

EXPORTS

UNMANUFACTURED—				
Waste and reclaimed rubber	1,309,900	£27,497	380,800	£6,567
Rubber substitutes	504,800	32,180	64,000	1,791
Totals	1,814,700	£59,677	444,800	£8,358
MANUFACTURED—				
Boots and shoes...*dozen pairs*	7,661	£16,685	7,789	£17,574
Waterproof clothing	.....	256,145	.....	74,946
Insulated wire	.....	130,499	.....	164,576
Submarine cables	.....	303,406	.....	86,682
Tires and tubes	.....	590,002	.....	244,395
Other rubber manufactures	.....	486,516	.....	207,045

EXPORTS—COLONIAL AND FOREIGN

UNMANUFACTURED—				
Crude rubber:				
To Sweden, Norway, Denmark	141,900	£17,347	51,800	£2,664
Germany	619,100	75,530	701,200	29,916
Belgium	560,800	68,517	52,700	3,828
France	4,408,600	576,609	1,036,100	50,049
Spain	11,200	1,631	53,700	3,240
Italy	1,045,900	130,004	128,800	6,634
Austria-Hungary	22,400	3,555	237,100	13,078
Other European countries	17,900	2,401	88,000	3,534
United States	12,286,000	1,630,407	2,238,500	95,823
Canada	666,500	90,317	.....	.....
Other countries	135,300	17,612	3,400	209
Totals	19,915,600	£2,613,930	4,591,300	£208,975
Waste and reclaimed rubber	1,000	37	.....	.....
Totals, unmanufactured	19,916,600	£2,613,967	4,591,300	£208,975
Gutta percha and balata	181,800	£35,351	63,000	£12,263
MANUFACTURED—				
Boots and shoes...*dozen pairs*	60	£245	165	£427
Waterproof clothing	.....	.....	.....	27
Insulated wire	.....	.....	.....	200
Tires and tubes	.....	17,362	.....	22,401
Other manufactures	.....	5,002	.....	1,457

KOKOMO "EVERLASTER TWIN-GRIP" FABRIC CASINGS

The Kokomo long-life fabric tires now have the "Everlaster Twin-Grip" tread that was adopted last year on Kokomo bicycle tires and automobile cord tires, and described in THE INDIA RUBBER WORLD, February 1 and May 1, 1920. Their thick side-walls protect against rut cuts; accurate bead construction avoids rim chafing and wearing friction; and the rubber cushioning between the fabric layers is the seat of plaint strength. The tread owes its favor to a center rib which resists skidding forces. It thus combines the light-running, easy-steering qualities of ribbed tread tires with the protection offered car and driver by non-skid casings. All Kokomo tires now have black treads and Kokomo cords are plainly designated by a red shield on their gray walls.—Kokomo Rubber Co., Kokomo, Indiana.

RUBBER STATISTICS FOR ITALY

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	Eleven Months Ended November 1919		1920	
UNMANUFACTURED—	Quintals[1]	Lire[2]	Quintals	Lire
Crude rubber and gutta percha —raw and reclaimed:				
From Great Britain	132		950	
French Asian Colonies	659		2,075	
India and Ceylon	24,563		7,299	
Straits Settlements	43,996		37,115	
French African Colonies	3,977	97,489,950	1,357	61,286,400
Belgian Congo	1,033		2,064	
Brazil	27,344		10,449	
Other countries	917		3,202	
Totals	102,621	97,489,950	64,511	61,286,400
Rubber scrap	14,700	2,105,000	247	37,050
Totals, unmanufactured	117,321	99,594,950	64,758	61,323,450
MANUFACTURED—				
India rubber and gutta percha—				
Threads	207	600,300	370	1,073,000
Sheets, including hard rubber	121	238,300	268	508,500
Tubes	218	318,350	193	365,750
Belting	561	925,650	764	1,260,600
Rubber-coated fabrics in pieces	434	916,000	789	1,569,400
Boots and shoes.....*pairs*	52,235	1,044,700	167,411	3,348,220
Elastic webbing	292	992,800	655	2,227,000
Clothing and articles for travel	9	36,000	189	756,000
Tires and tubes—				
From Belgium	74		828	
France	3,987		5,040	
Great Britain	1,214	15,041,600	8,246	43,512,000
United States	90		1,385	
Other countries	7		41	
Other manufactures	13,894	26,027,400	15,184	35,938,400
Totals, manufactured	.....	46,141,100	.....	90,558,870
Total imports	.....	145,736,050	.....	151,882,320

EXPORTS OF CRUDE AND MANUFACTURED RUBBER

UNMANUFACTURED—				
India rubber and gutta percha— raw and reclaimed:				
To Austria	.....		543	
Spain	2,140	2,109,500	797	2,742,000
United States	2,078		3,600	
Other countries	1		544	
Totals	4,219	2,109,500	5,484	2,742,000
Waste	4,201	840,200	8,298	1,659,600
Totals, unmanufactured	8,420	2,949,700	13,782	4,401,600
MANUFACTURED—				
India rubber and gutta percha—				
Threads	480	1,488,000	356	1,103,600
Sheets, including hard rubber	87	185,600	305	572,000
Tubes	842	1,185,350	1,995	2,591,250
Belting	95	199,500	.....	.....
Rubber-coated fabrics in pieces	255	766,500	324	1,583,200
Boots and shoes.....*pairs*	6,064	121,280	587	11,740
Other	.....	.....	2	3,000
Elastic webbing	868	3,070,400	1,263	4,799,400
Clothing and articles for travel	42	210,000	865	4,325,000
Tires and tubes:				
To Austria	862		3,367	
Belgium	1,306		2,380	
Czecho-Slovakia	452		1,174	
Denmark	342		1,455	
France	1,041		2,131	
Great Britain	6,254		10,579	
Netherlands	224		535	
Roumania	150		1,374	
Spain	610		1,412	
Switzerland	1,779	47,487,500	730	120,772,500
Hungary	.....		264	
India and Ceylon	944		4,928	
Dutch East Indies	344		2,394	
Straits Settlements	198		2,853	
Australia	507		1,079	
Argentina	1,531		3,400	
Brazil	1,055		2,898	
Other countries	1,396		5,326	
Other manufactures	3,959	7,338,400	13,255	24,428,000
Totals, manufactured	.....	62,052,530	.....	160,189,690
Total exports	.....	65,002,230	.....	164,591,290

[1]One quintal equals 220.46 pounds.
[2]One lira equals $0.193 (normal).

THE MARKET FOR RUBBER SCRAP

NEW YORK

THE rubber scrap market is essentially stagnant. There is a small amount of business, mainly in boots and shoes, for the current needs of reclaimers. The continued low prices for crude rubber, high freight rates and the general slackness of industry have eliminated to the vanishing point the demand for rubber scrap.

Exports of rubber scrap for the nine months ended March, 1921, total only one-half those for the same period of 1920, although double those for the same months of 1919.

QUOTATIONS FOR CARLOAD LOTS DELIVERED

May 24, 1921

Prices subject to change without notice

BOOTS AND SHOES			
Arctic tops	lb.	*0.075	@
Boots and shoes	lb.	*.03½	@ .04
Trimmed arctics	lb.	*.02¾	@ .03
Untrimmed arctics	lb.	*.02	@ .02¼
HARD RUBBER			
Battery jars, black compound	lb.	*.07½	@ .01
No. 1, bright fracture	lb.	.12	@ .15
INNER TUBES			
No. 1	lb.	.06	@ .06½
Compounded	lb.	.04¼	@ .04½
Red	lb.	.04¼	@ .04¾
MECHANICALS			
Black scrap, mixed, No. 1	lb.	*.02¼	@ .03
No. 2	lb.	*.01½	@ .02
Car springs	lb.	*.02½	@ .03
Heels	lb.	*.02½	@ .03
Horse-shoe pads	lb.	*.02½	@ .03
Hose, air brake	lb.	*.01	@ .01½
fire, cotton lined	lb.	*.01	@
garden	lb.	.07	@ .01
Insulated wire stripping, free from fiber	lb.	*.01½	@ .02
Matting	lb.	*.01	@
Red packing	lb.	*.04½	@ .05
Red scrap, No. 1	lb.	*.07	@ .08
No. 2	lb.	*.05½	@ .06
White scrap, No. 1	lb.	*.07	@ .07½
No. 2	lb.	*.06	@ .06½
TIRES			
PNEUMATIC—			
Auto peelings	lb.	.02	@ .02¼
Bicycle	lb.	*.01½	@ .02
Standard white auto	lb	*.02¼	@ .02¾
Mixed auto	lb.	*.01	@ .01½
Stripped, unguaranteed	lb	*.01	@ .01½
White, G. & G., M. & W., and U. S.	lb.	*.02¾	@
SOLID—			
Carriage	lb.	*.02½	@ .02¾
Irony	lb.		@
Truck, clean	lb.	*.01½	@ .02

*Nominal.

THE MARKET FOR COTTON AND OTHER FABRICS

NEW YORK

AMERICAN COTTON. Early in the month the spot market for middling upland cotton took an upward tendency of 50 points, rising on May 2 from 12.40 to 12.90. Steady rise followed, except for a slight drop on the fifth, until 13.05 was reached on the twelfth. Since that time spot prices have fluctuated at somewhat lower levels until 12.50 had been reached on May 24, only 10 points above the starting point of the month. Trade continues very quiet.

EGYPTIAN COTTON. Prices have been relatively weak for Egyptian cotton, due largely to lack of demand in the Alexandria market which is now being affected quite as much by the coal situation in England as by the limited buying here.

Crop advices from Egypt continue to be unsatisfactory. The crop there is having a very late start, which will increase its susceptibility to worm attack. There is much fear that damage from this cause may be very heavy this year, owing to the lifting of the government decree that ginning shall cease after May 1.

ARIZONA COTTON. Arizona Pima prices are steady. Demand is very small although spinners are showing a good deal of interest

in prices, not only in Arizona cotton but in Egyptian as well. There is a very heavy cut in acreage in Arizona and the crop is expected to amount to less than half that grown last season. However, unless there should be a very radical change in the mill situation there should be ample extra-staple cotton to meet the world's needs for another year at least.

MECHANICAL DUCKS AND DRILLS. The market is slowly but certainly improving in breadth of demand with a better tone generally. The trade is looking forward to an approximately normal market on these fabrics in the late summer or the early autumn.

RAINCOAT FABRICS. The interest in these materials has been very quiet during the past month and prices are practically unchanged from a month ago.

SHEETINGS. There is a small improvement in this market since last month. Buyers are taking care of their requirements for thirty to sixty days principally on light-weight sheetings. The heavier numbers are moving slowly.

TIRE FABRICS. The demand for tire fabrics seems to be increasing in volume. Each month additional tire manufacturers use up their stocks on hand and come into the market, either for new purchases or for delivery on old purchases; thus there is a materially better interest in tire fabrics. This growth in demand is expected to continue through the summer and well into the autumn, when the tire manufacturing output naturally decreases.

NEW YORK QUOTATIONS

MAY 24, 1921

Prices subject to change without notice

BURLAPS			
32—7-ounce	100 yards	*$3.50	@
32—8-ounce		*3.50	@
40—7½-ounce		*4.00	@
40—8-ounce		*4.00	@
40—10-ounce		*4.50	@
40—10½-ounce		*4.50	@
45—7½-ounce		*4.50	@
45—8-ounce		*4.50	@
45—10-ounce		*5.00	@
DRILLS			
38-inch 2.00-yard	yard	.13	@
40-inch 3.47-yard		.07¼	@
52-inch 1.90-yard		.15⅞	@
52-inch 1.95-yard		.15⅜	@
60-inch 1.52-yard		.19⅞	@
DUCK			
CARRIAGE CLOTH			
38-inch 2.00-yard enameling duck	yard	.14½	@
30-inch 1.74-yard		.16¼	@
72-inch 16.66 ounce		.34⅛	@
72-inch 17.21-ounce		.35½	@
MECHANICAL			
Hose	pound	.26	@
Belting		.26	@
HOLLANDS, 40-INCH			
Acme	yard	.21	@
Endurance		.24	@
Penn		.29	@
Piece goods, 40-inch		.22	@
Piece goods, 36-inch		.19	@
RAINCOAT FABRICS			
COTTON			
Bombazine 64 x 60	yard	.12½	@
60 x 48		.11½	@
Cashmeres, cotton and wool, 36-inch, tan		.67½	@
Twills 64 x 72		.10	@ .12
60 x 102		.16	@
Twill, mercerized, 36-inch, blue and black		.27½	@
tan and olive		.25	@
Tweed		.40	@ 1.00
printed		.18	@
Plaids 60 x 48	yard	.10	@
56 x 44		.11	@
Repp		.25	@
Prints 60 x 48		.13	@
64 x 60		.14	@
IMPORTED WOOLEN FABRICS SPECIALLY PREPARED FOR RUBBERIZING—PLAIN AND FANCIES			
63-inch, 3¼ to 7½ ounces	yard	1.00	@ 2.50
36-inch, 2¾ to 5 ounces		.60	@ 1.50
IMPORTED PLAID LINING (UNION AND COTTON)			
63-inch, 3½ to 7 ounces	yard	.60	@ 1.37½
36-inch, 2 to 4 ounces		.37½	@ .80

*Nominal.

SHEETINGS, 40-INCH			
48 x 48, 2.35-yard	yard		@
48 x 48, 2.50-yard		$0.10	@
48 x 48, 2.85-yard		.08¾	@
64 x 68, 3.15-yard		.09¾	@
56 x 60, 3.60-yard		.08¼	@
48 x 44, 3.75-yard		.07½	@
SILKS			
Canton, 38-inch	yard	.27½	@
Schappe, 36-inch		.42½	@
STOCKINETTES			
SINGLE THREAD			
3½ Peeler, carded	pound		@
4½ Peeler, carded			@
6½ Peeler, combed			@
DOUBLE THREAD			
Zero Peeler, carded	pound		@
3½ Peeler, carded			@
6½ Peeler, combed			@
TIRE FABRICS			
BUILDING			
17½-ounce Sakellarides, combed	pound	.90	@ 1.05
17½-ounce Egyptian, combed		.80	@ .85
17½-ounce Egyptian, carded		.75	@
17½-ounce Peeler, combed		.80	@ .82
17½-ounce Peeler, carded		.55	@ .60
CORD			
15-ounce Egyptian	pound	.95	@
BICYCLE			
8-ounce American	pound	.70	@ .80
10-ounce American		.70	@ .80
CHAFER			
9¼-ounce Sea Island	pound	1.00	@
9¼-ounce Egyptian, carded		.80	@ .90
9¼-ounce Peeler, carded		.70	@ .80

THE MARKET FOR CHEMICALS AND COMPOUNDING INGREDIENTS

NEW YORK

THE market for chemicals and compounding ingredients continues to share the general improvement noticeable in industrial lines. The very low-priced materials like barytes and whiting are meeting a very serious obstacle to their free movement in the high freight rates which prevail. Bills to protect the barytes, barium products and lead industries are being urged in Washington, owing to dumping of foreign competitive products.

The situation of domestic barytes is particularly difficult between high freight rates and the threatened invasion of importations from German sources.

ANILINE OIL. The market is unsettled and weak. Prices have ruled from 20 to 26 cents a pound with distressed lots at 18 cents.

BARYTES. Prices rule very low. The market is quiet and movement of the domestic product very restricted on account of oppressive freight charges.

BENZOL. Spot stocks of both pure and 90 per cent have been light during the last month. The 90 per cent is going into consumption extensively as a source of motor fuel. The demand for both grades is good, with 90 per cent at 25 to 31 cents a gallon and the pure at 27 to 36 cents.

BLANC FIXE. The same influences prevail to stagnate the movement of this material as in the case of barytes, consequently the market is very dull.

BLUE LEAD. The rubber trade is somewhat interested in restocking with blue lead in moderate quantities. The material is in fairly good demand at 7½ to 8 cents a pound.

CARBON BLACK. Early in the month the ruling price was 12 cents with demand improving, followed shortly by reduction of price to 10 cents to stimulate the demand from tire manufacturers which met with some success. At present, however, the demand is rather routine.

CARBON BISULPHIDE. The demand outside the rubber trade was active early in the month, succeeded by increased call from the latter trade with continuing interest to date.

CARBON TETRACHLORIDE. Normal demand at 12 cents was succeeded by fair call at 6 to 7½ cents a pound. The month closed with supplies in large volume quoted at 11½ to 12½ cents.

CHINA CLAY. Market conditions were marked by generally light demand. Freight rates are very much against the free movement of domestic stocks.

DRY COLORS. A steady improvement has been noted in most colors. Owing to the quiet condition of the market there has been a tendency to lower prices to stimulate trade conditions.

LITHARGE. The trade in this material has been steady routine business with mild interest only on the part of rubber manufacturers. Early in May a reduction of ½-cent a pound was made and demand improved at the new quotations of 9½ to 10 cents a pound.

LITHOPONE. This is the one item on which good business can be reported. Producers are running their plants to capacity. Prices have ruled steady the entire month at 7 cents a pound for lithopone in bags. Manufacturers of tires are said to have been seeking supplies.

SOLVENT NAPHTHA. Available supplies are heavy, with demand light. Quotations range from 25 to 30 cents a gallon.

SUBLIMED LEAD. Much the same conditions prevail as in the case of litharge. The demand is inactive. Quotations at 7¼ to 8¼ cents a pound.

SULPHUR. The market for commercial flour ranged through dull, from good to routine, where it stands at present.

TALC. There is little interest, supplies light and demand stagnant.

TAR. Pine tar, both kiln and retort, is quoted at $12.50 a barrel with little interest.

WHITING. Chalk whiting is meeting vigorous competition from the by-product variety and prices have been reduced from 5 to 10 cents a 100 pounds in consequence. The demand has fallen off to routine requirements.

ZINC OXIDE. Producers are operating at reduced capacity and prices continue unchanged. Some rubber and tire trade orders are appearing and steady improvement rules. The consumption of the rubber trade is said to total 70 per cent of the domestic production.

NEW YORK QUOTATIONS

May 24, 1921

Prices subject to change without notice

ACCELERATORS, ORGANIC				
Accelerene (f. o. b. English port)	lb.	13s.	@	
Accelemal	lb.	$0.60	@	.65
Adco	lb.	.75	@	
Aldehyde ammonia crystals	lb.	1.00	@	1.05
Aniline oil	lb.	.20	@	.30
Excellerex	lb.	.65	@	.75
Formaldehyde aniline	lb.	.60	@	.65
Hexamethylene tetramine	lb.	1.00	@	1.05
Lead oleate	lb.	.20	@	
N. C. C.	lb.		@	
No. 999	lb.	.13½	@	
Paradin	lb.	.65	@	
Paraphenylene diamine	lb.	1.75	@	2.00
Thiocarbanilide (factory)	lb.	.50	@	.65
Vulcocene	lb.	.35	@	
ACCELERATORS, INORGANIC				
Lead, dry red	lb.	.10	@	
sublimed blue	lb.	.07¼	@	.07½
sublimed white	lb.	.08¼	@	
white, basic carbonate	lb.	.07½	@	.08
Lime, flour	lb.	.01½	@	.02½
Superfine	lb.	.03	@	
Litharge, domestic	lb.	.10	@	
imported	lb.	.17	@	
sublimed	lb.		@	
Magnesia, carbonate, light	lb.	.09	@	
calcined extra light	lb.	.55	@	
calcined light	lb.	.23	@	.30
calcined medium light	lb.	.25	@	
calcined heavy	lb.	.06	@	.07
ACIDS				
Acetic 28 per cent	cwt.	2.50	@	3.00
glacial, 99 per cent	cwt.	9.50	@	11.00
Cresylic (97/99% straw color)	gal.	.85	@	
(95% dark)	gal.	.80	@	
Muriatic, 20 degrees	cwt.	1.20	@	1.75
Nitric, 36 degrees	cwt.	5.50	@	6.50
Sulphuric, 66 degrees	ton	17.00	@	20.00
ALKALIES				
Caustic soda (76% factory)	lb.	.03¾	@	
Soda ash, 58%	cwt.	.02½	@	
COLORS				
Black				
Bone, powdered	lb.	.06½	@	.14
granulated	lb.	.11	@	
Carbon black (sacks, factory)	lb.	.09	@	.14
pressed	lb.	.10	@	.15
Dipped goods	lb.	1.00	@	
Drop	lb.	.08	@	.16
Ivory black	lb.	.17	@	.45
Lampblack	lb.	.10½	@	.45
Oil soluble aniline	lb.		@	
Rubber black	lb.		@	
Rubber makers' non-flying black	lb.		@	
Blue				
Cobalt	lb.	.25	@	.30
Dipped goods	lb.	1.00	@	
Prussian	lb.	.60	@	
Rubber makers' blue	lb.		@	
Ultramarine	lb.	.16	@	.35
Brown				
Iron oxide	lb.	.04	@	.08
Sienna, Italian, raw and burnt	lb.	.07	@	.08
Sienna, Italian, raw (tan color)	lb.	.07	@	.14
Umber, Turkey, raw and burnt	lb.	.05½	@	.07¾
Vandyke	lb.	.06	@	.08
Green				
Chrome, light	lb.	.36	@	.40
medium	lb.	.40	@	.52
dark	lb.	.52	@	.58
commercial	lb.	.13½	@	
tile	lb.	.08	@	.17
Dipped goods	lb.	1.00	@	
Oxide of chromium	lb.	.60	@	.70
Rubber makers' green	lb.		@	
Red				
Antimony, crimson	lb.	.40	@	.46
crimson, F.	lb.	.35	@	
crimson, R. M. P.	lb.	.55	@	
Antimony, golden	lb.	.25	@	.30
golden, R. M. P.	lb.	.25	@	
golden 1	lb.	.30	@	
golden 2	lb.	.25	@	
7-A	lb.	.42	@	
vermilion sulphuret	lb.	.55	@	
red sulphuret	lb.	.23	@	.25
Arsenic, red sulphide	lb.	.14	@	
Dipped goods, red	lb.	1.25	@	
purple	lb.	1.00	@	
orange	lb.	1.25	@	
Indian	lb.	.13½	@	
Iron oxide, reduced grades	lb.	.04	@	.12
pure bright	lb.	.15½	@	

COLORS—Continued

Maroon oxide	lb.	$0.13½	@
Oil soluble aniline, red	lb.		@
orange	lb.		@
Oximony	lb.	.17½	@
Para toner	lb.	1.60	@
Red excelsior	lb.		@
Rubber makers' red	lb.	3.50	@
purple	lb.	2.50	@
Spanish natural	lb.	.05	@ .06
Toluidine toner	lb.	3.00	@ 3.25
Venetian	lb.	.03	@ .06
Vermilion, American	lb.	.25	@ .30
permanent	lb.	.32	@
English quicksilver	lb.	1.25	@ 1.30

White

Albalith	lb.	.07	@ .07½
Aluminum bronze, extra brilliant	lb.		@
extra fine	lb.		@
Lithopone, Beckton white	lb.	.07	@ .07½
Lithopone, domestic (factory)	lb.	.07	@ .07½
Ponolith (carloads, factory)	lb.		@
Rubber-makers' white	lb.		@

		C.L.	L.C.L.
Zinc oxide. American Horse Head	lb.	.08¼ @	.09¼
Special	lb.	.09¼ @	.09¼
XX red	lb.	.08¾ @	.09¼
French process, Florence brand (factory):			
White seal	lb.	.12¼ @	.12½
Green seal	lb.	.11 @	.11½
Red seal	lb.	.10 @	.10½
White seal, imported	lb.	.12¼ @	.12½
Azo factory:			
ZZZ (lead free)	lb.	.08¾ @	.09¼
ZZ (under 5% leaded)	lb.	.08 @	.08½
Z (8-10% leaded)	lb.	.07¾ @	.08½

Yellow

Cadmium, sulphide, yellow, light, orange	lb.		@
red	lb.		@
Chrome, light and medium	lb.	.21	@
C. P.	lb.	.21	@
Dipped goods	lb.	1.25	@
Ochre, domestic	lb.	.03	@
imported	lb.	.03½	@ .04½
Oil soluble aniline	lb.		@
Rubber makers' yellow	lb.	2.50	@ 3.50
Zinc chromate	lb.	.40	@

COMPOUNDING INGREDIENTS

Aluminum flake (carload)	ton	33.00	@40.00
hydrate	lb.	.22	@
Ammonium carbonate (lump)	lb.	.07½	@ .10
Asbestine	ton	20.00	@30.00
Barium, carbonate, precipitated	ton	85.00	@
dust	ton	100.00	@
Barytes, pure white (f. o. b. works)	ton	28.00	@
off color	ton	20.00	@
uniform floated	ton	28.00	@
Basofor	lb.	.05	@
Beta-naphthol	lb.	.40	@
Blanc fixe	lb.	.04½	@
Bone ash	lb.		@
Carrara filler (factory)	lb.		@
Chalk, precipitated, light	lb.	.02¾	@ .03¼
heavy	lb.	.02¼	@ .02½
China, clay, Dixie	ton	22.00	@35.00
Blue Ridge	ton	22.00	@35.00
domestic	ton	7.50	@ 9.00
imported	ton	16.00	@24.00
Cotton linters, clean mill run (factory)	lb.	.01¾	@ .02¼
Diatomite	lb.	.03	@
Fossil flour (powdered)	ton	60.00	@
(bolted)	ton	65.00	@
Glue, high grade	lb.	.30	@ .40
medium	lb.	.25	@ .30
low grade	lb.	.17	@ .19
Graphite, flake (400-pounds bbl.)	lb.	.15	@
amorphous	lb.	.05	@
Ground glass FF. (bbls.)	lb.		@
Infusorial earth (powdered)	ton	60.00	@
(bolted)	ton	65.00	@
Liquid rubber	lb.	.16	@
Mica, powdered	lb.	.15	@
Phenanthrene	lb.	.08	@ .10
Pumice stone, powdered (bbl.)	lb.	.03	@ .08
Rotten stone, powdered	lb.	.02½	@ .04½
Rubber paste	lb.		@
Silica, aluminum	ton	25.00	@30.00
gold bond (factory)	ton		@
silver bond (factory)	ton		@
Soap bark, crushed	lb.	.12	@ .13
Soapstone, powdered gray (carload)	ton	12.00	@
Starch, powdered corn	cwt.	2.43	@ 2.81
Talc, powdered soapstone	ton	22.00	@25.00
Terra blanche	ton	25.00	@28.00
Tripoli flour, air-floated, cream or rose (factory)	ton	30.00	@
white (factory)	ton	32.00	@
Tyre-lith	ton	95.00	@
Whiting, Alba	cwt.		@
Columbia	cwt.		@
commercial	cwt.	1.20	@ 1.25
Danish (factory)	ton		@
English cliffstone	cwt.	1.75	@ 2.00
gilders	cwt.	1.20	@ 1.35
Paris, white, American	cwt.	1.50	@ 1.60
Quaker	ton	13.00	@15.00
Super	ton		@
Wood pulp, imported	ton		@
XXX (f. o. b. plant)	ton	36.00	@
X (f. o. b. plant)	ton	35.00	@
Wood flour	ton		@

MINERAL RUBBER

Elateron (c. l. factory)	ton		@
(l. c. l. factory)	ton		@
Gilsonite	ton	$70.00	@
Genasco (c. l. factory)	ton	50.00	@
(l. c. l. factory)	ton	52.00	@
Hard hydrocarbon	ton	35.00	@45.00
Soft hydrocarbon	ton	35.00	@40.00
320 M. P. hydrocarbon (c. l. factory)	ton	50.00	@55.00
(l. c. l. factory)	ton	57.50	@
300/310 M. P. hydrocarbon (c. l. factory)	ton	40.00	@
(l. c. l. factory)	ton	45.00	@
M. R. X.	ton		@
Pioneer, M. R. (c. l. factory)	ton	48.00	@
(l. c. l. factory)	ton	50.00	@
Raven M. R.	ton		@
Robertson, M. R. pulverized (c. l. factory)	ton	87.50	@
M. R. pulverized (l. c. l. factory)	ton	90.00	@
M. R. (c. l. factory)	ton	62.50	@
M. R. (l. c. l. factory)	ton	65.00	@
Rubrax (factory)	ton	50.00	@
States "A" (c. l. factory)	ton	45.00	@
No. 1 (c. l. factory)	ton	40.50	@
Synpro, granulated, M. R. (factory)	ton	77.50	@

OILS

Avoilas compound	lb.	.16	@ .18
Castor, No. 1, U. S. P.	lb.	.10	@
No. 3, U. S. P.	lb.	.09½	@
Corn	lb.	.10	@
Cotton	lb.	.09	@
Glycerine (98 per cent)	lb.	.18	@ .19
Linseed, raw (carloads)	gal.	.72	@
Linseed compound	gal.		@
Palmoline	lb.	.14	@ .15
Palm niger	lb.	.07	@
Peanut	lb.	.09	@
Petrolatum	lb.	.06	@ .08
Petrolatum, sticky	lb.	.08	@ .10
Pine, steam distilled	gal.	1.15	@ 1.32
Rapeseed, refined	lb.	.12	@
blown	lb.	.12½	@
Rosin	gal.	.40	@ .50
Synpro	gal.	.38	@ .70
Soya bean	lb	.08	@
Tar	gal.	.32	@ .35

RESINS AND PITCHES

Cantella gum	lb.	.50	@
Cumar resin, hard	lb.	.09	@ .13
soft	lb.	.09	@ .13
Tar, retort	bbl.	12.50	@14.35
kiln	bbl.	12.50	@13.50
Pitch, Burgundy	lb.	.04½	@
coal tar	ton	25.00	@
pine tar	lb.	.03½	@
ponto	lb.	.10	@
Rosin, K	280 lbs.	6.85	@
strained	280 lbs.	5.60	@
Shellac, fine orange	lb.	.90	@

SOLVENTS

Acetone (98.99 per cent, drums [6.62 lbs. per gal.])	lb.	.12½	@ .13½
Benzol (water white, 90% [7.21 lbs. per gal.])	gal.	.25	@ .31
pure	gal.	.27	@ .36
Carbon bisulphide (drums [10.81 lbs. per gal.])	lb.	.06¾	@ .07
tetrachloride (drums [13.28 lbs. per gal.])	lb.	.11½	@ .12½
Motor gasoline (steel bbls.)	gal.	.26	@
73@76 degrees (steel bbls.)	gal.	.37½	@
68@70 degrees (steel bbls.)	gal.	.35	@
Naphtha, V. M. & P. (steel bbls.)	gal.	.25	@
solvent	gal.	.28	@
Toluol, pure (7.21 lbs. per gal.)	gal.	.27	@ .33
Turpentine, spirits	gal.	.68¾	@
wood	gal.	.65	@
Xylol, pure (7.21 lbs. per gal.)	gal.	.40	@ .43
commercial	gal.	.28	@ .35

SUBSTITUTES

Black	lb.	.08	@ .15
White	lb.	.10	@ .17
Brown	lb.	.12	@ .16
Brown factice	lb.	.07	@ .15
White factice	lb.	.09	@ .18
Paragol, soft and medium	cwt.	8.81	@
hard	cwt.	8.81	@

VULCANIZING INGREDIENTS

Lead, black hyposulphite (black hypo)	lb.	.40	@
Orange mineral, domestic	lb.	.11¾	@ .13½
Sulphur chloride (jugs)	lb.	.16½	@ .20
(drums)	lb.	.06½	@ .08
Sulphur, flour, Brooklyn brand (carloads)	cwt.		@
Brooklyn brand (less carload)	cwt.		@
Bergenport (carloads, factory)	cwt.	2.55	@
pure soft	cwt.	2.30	@
superfine (carloads, factory)	cwt.		@

(See also Colors—Antimony.)

WAXES

Wax, beeswax, white, commercial	lb.	.55	@
ceresin, white	lb.	.14	@
carnauba	lb.	.20	@
Montan	lb.	.09	@
ozokerite, black	lb.	.30	@
green	lb.	.30	@
paraffin	lb.	.03½	@ .08
Sweet wax	lb.	.12	@

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